CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

OCTOBER 15, 1996

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Low Risk Migration

Forging A Safer Route To Client/Server

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How To Keep Up With New Technology

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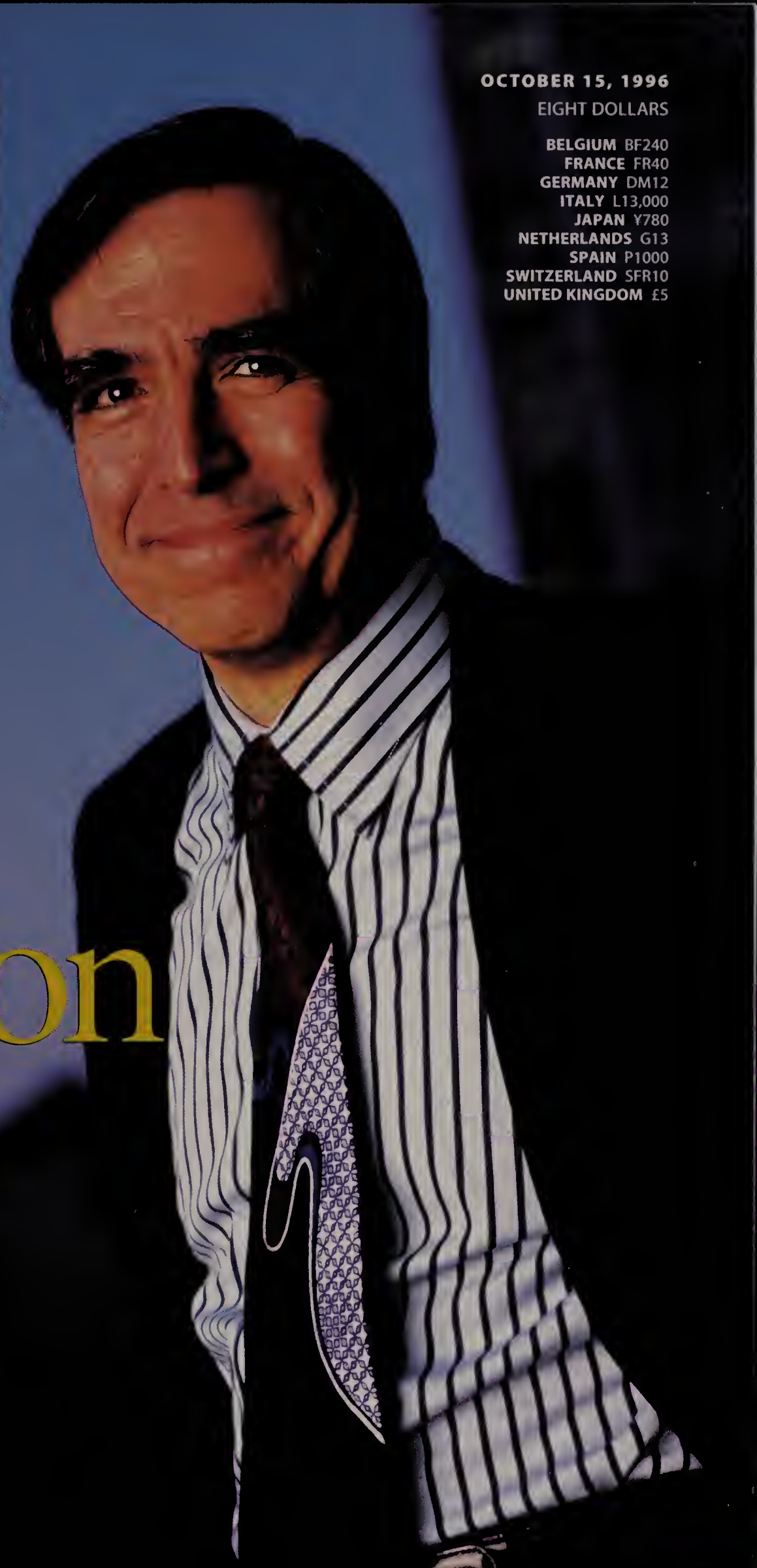

Ken Moskowitz used prototyping and parallel testing to reduce risk at Standard & Poor's

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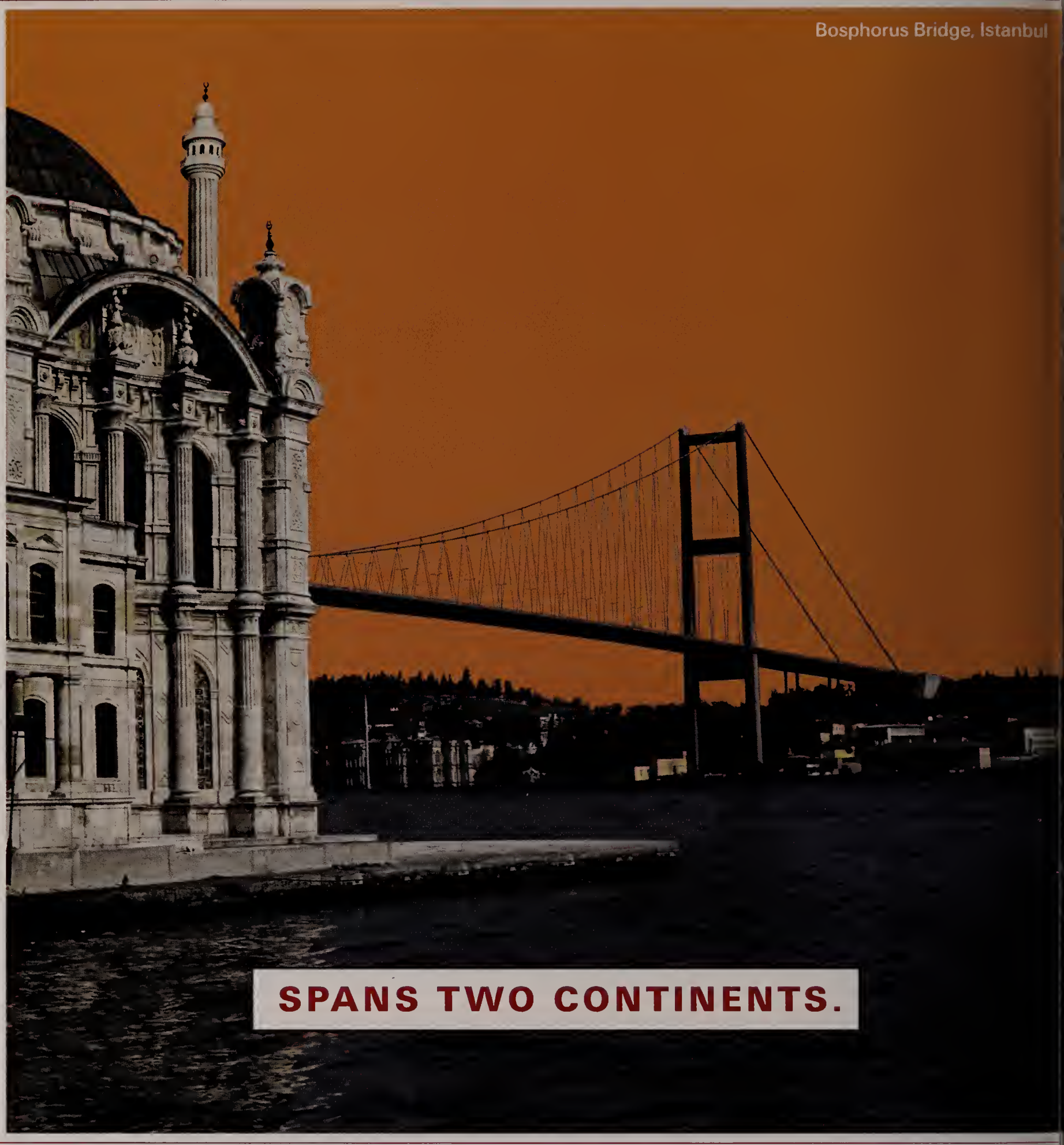

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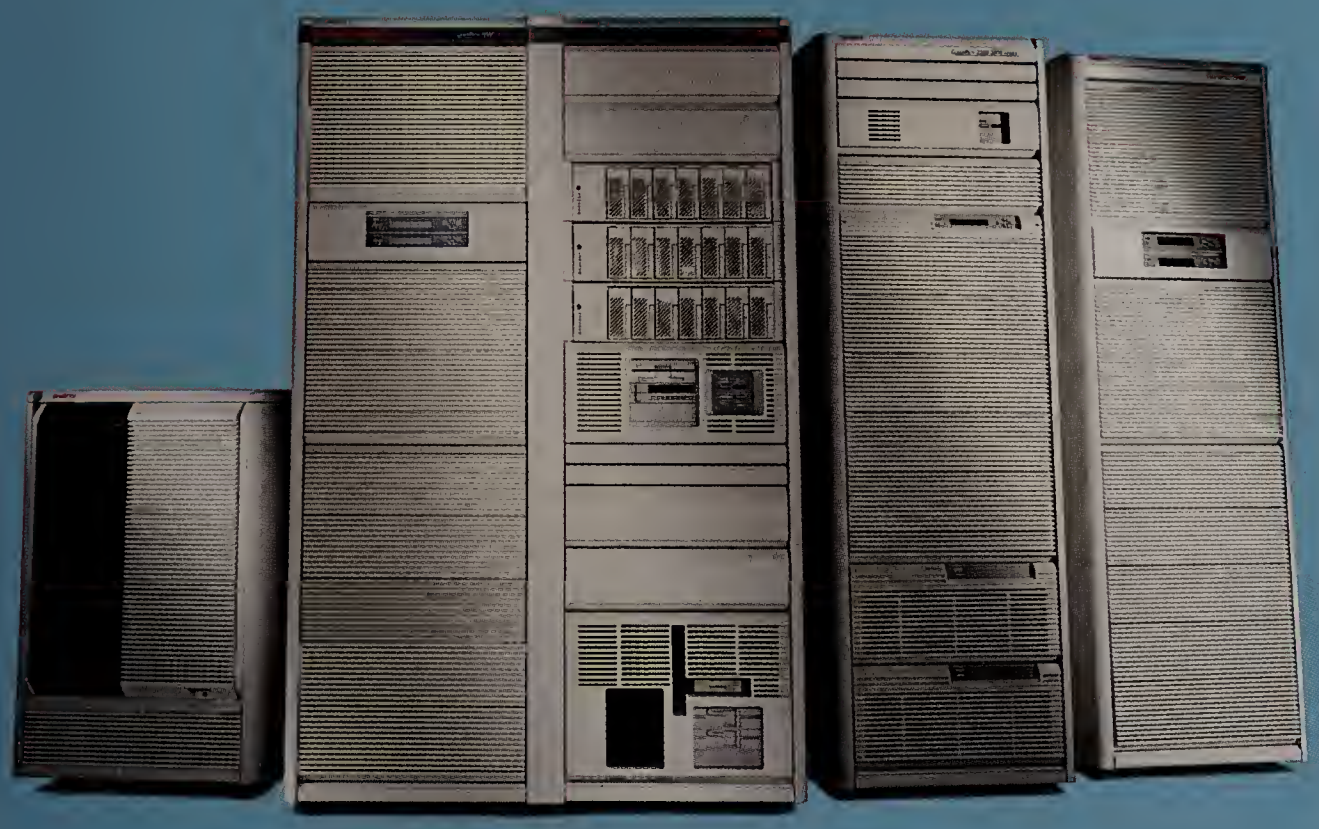

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Cover photo by Erica Freudenstein

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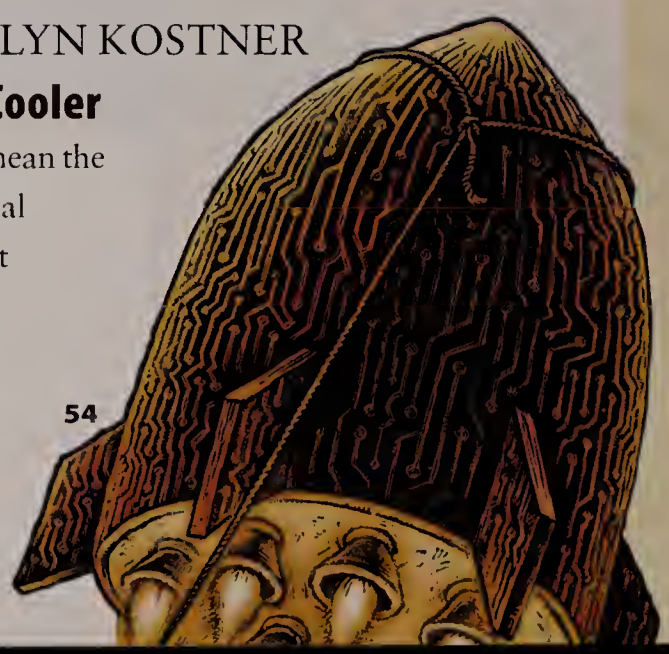

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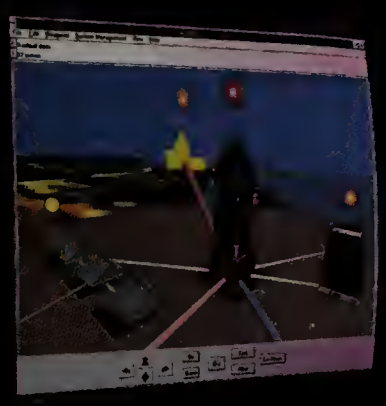

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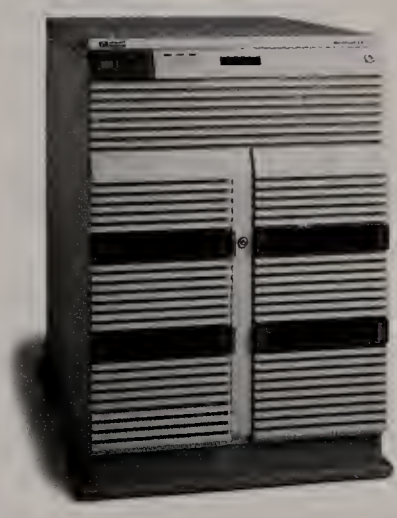

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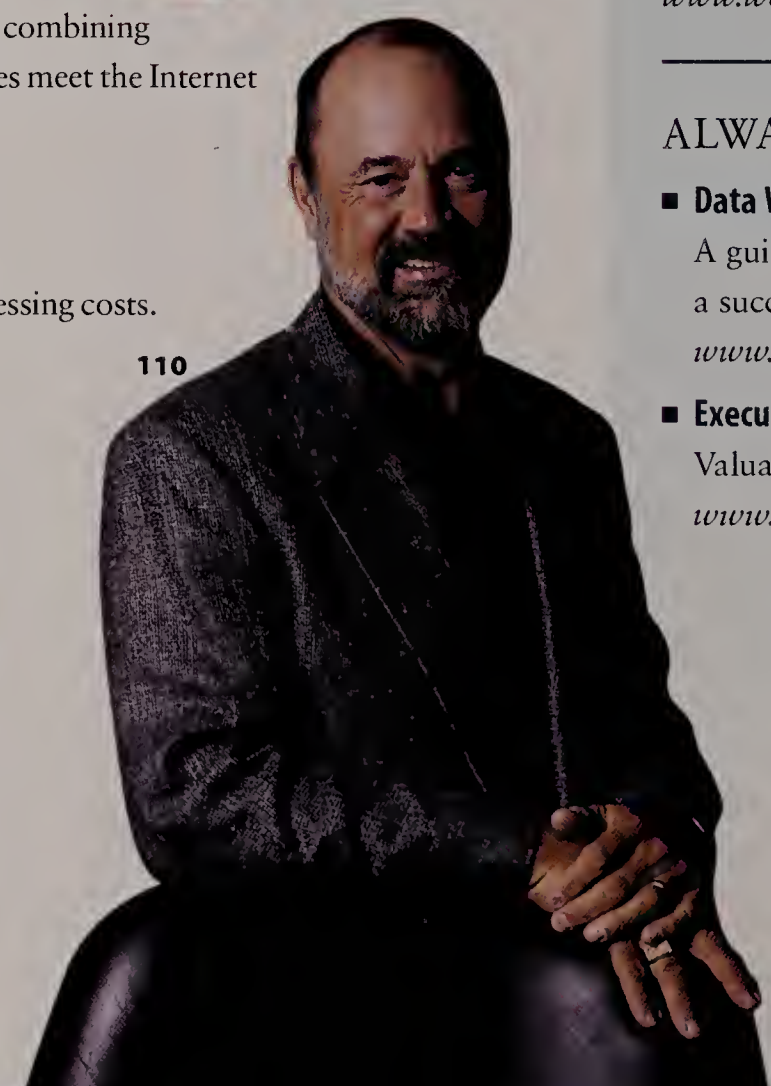

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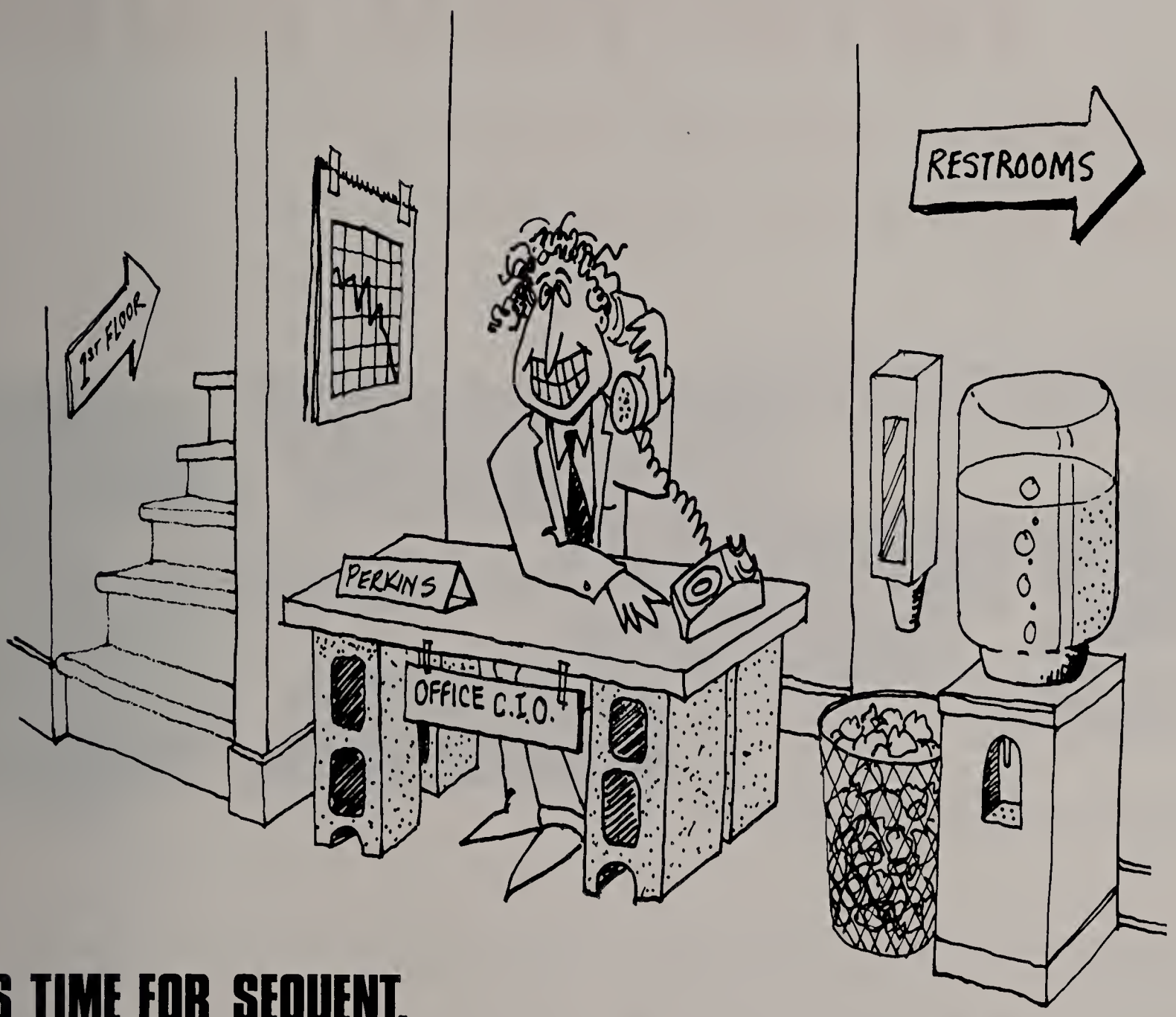

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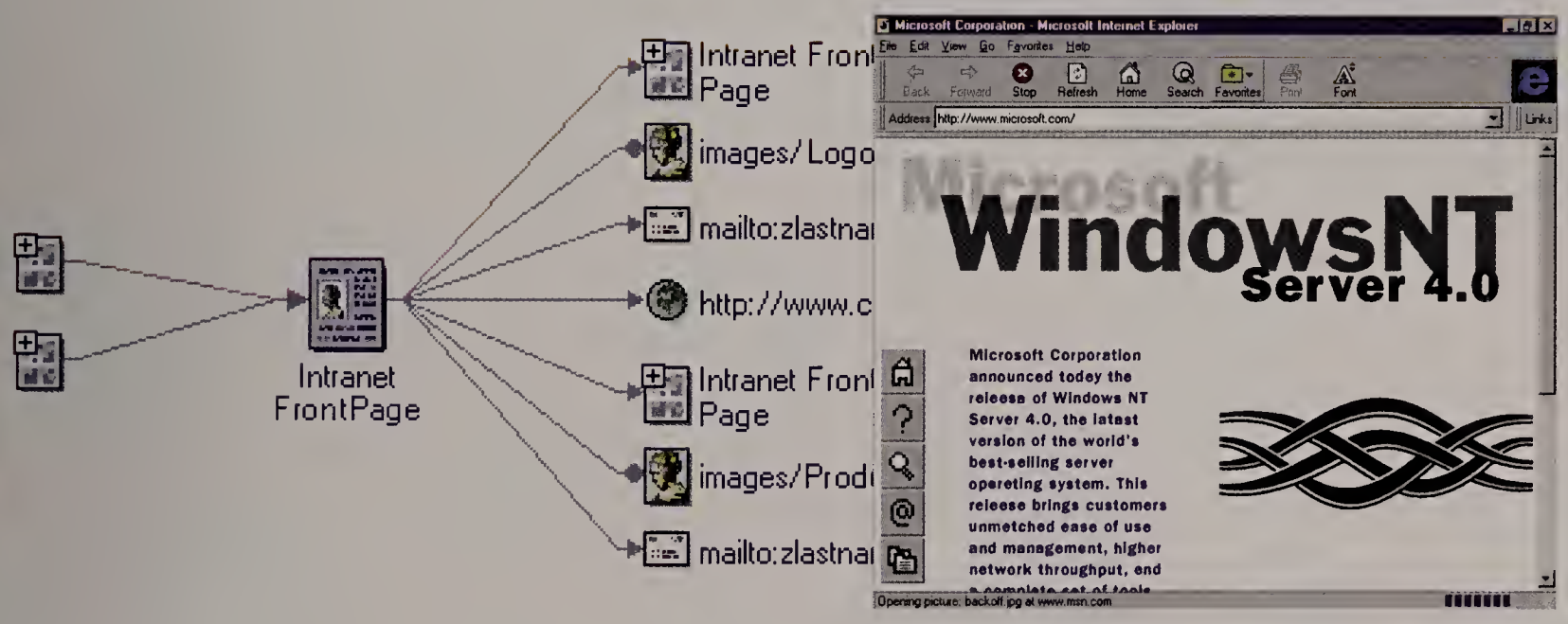
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In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

Talk about your Augean stables. Even Hercules would have a hard time keeping up with the current pace of technological change.

Paul Strassmann, noted author, IT consultant and former CIO for the Department of Defense, makes one of the more apt analogies for the current state of affairs in a paper posted on his Web site (*www.strassmann.com/consulting/assessment.html*). "It is demonstrable that information technology expenses are unrelated to profits," he writes. "It follows that firms must employ computers for other reasons. The most frequently given reason is the spending by competitors for the latest and most advanced computer systems. Applying this rationale makes computerization comparable to an arms race. Accordingly, if an adversary has machine guns, one cannot survive by relying on flintlock rifles. Affordability and payoff questions are not welcome under such circumstances."

While there are those who would argue with Strassmann on his point about profit (many companies have proven payback from the application of technology to their business processes), it is certainly also true that a large measure of brinkmanship is driving the deployment of new technology in the corporate world. In many companies, the CIO is like the nuclear physicist single-mindedly striving toward the Ultimate Goal without thinking of the human and financial consequences of such action. In others, the CIO just damn well better keep up or else.

Acknowledging the increasing difficulty of that task, Staff Writer Jennifer Bresnahan interviewed IS executives about their own techniques for staying on top of new developments (please see "Mission Possible," Page 54). She also compiled a list of resources—CIO member organizations, market research firms and think tanks—executives most frequently turn to for help.

How do you keep up with technology? Do you employ an advanced technology group? Rely on a CTO? Shell out a lot of dough for market research reports? Hobnob with your peers? How are those techniques working for you? Let us know and we'll share your experience with other readers in our new letters section (see Page 16). And good luck keeping your own stables clean.

lundberg@cio.com

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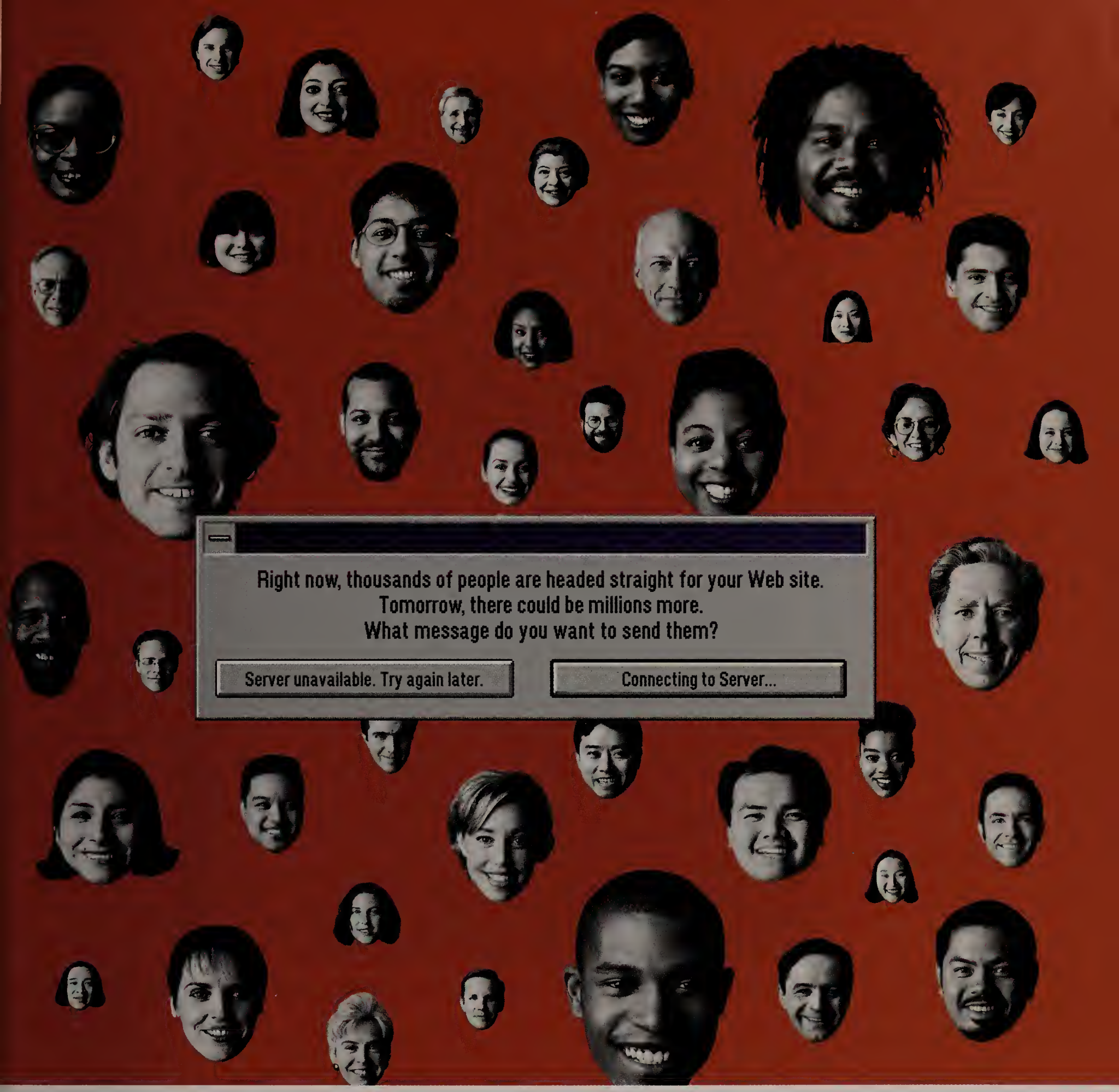
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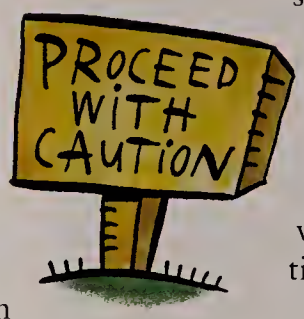
In Box

THE I.S. END RUN

In my company, an office equipment rental and leasing firm, we just completed a new customer service/support system designed to help our reps deliver better support. I mean "we," the company, developed it, not we the information systems department. The users designed the system, led the project and even hired the consultants themselves, leaving the IS department to plug in the new boxes. The users did a complete end run around us. This hadn't happened before, but it seems likely to happen again, since the effort seems to be an unqualified success. Users, their managers and our senior officers are boasting about how they took charge of all the strategic aspects of this project and merely tapped IS for technical support on the back end.

I can't say we in IS are happy about this trend. Your magazine and others talk about how IS should be a strategic partner in the business and work hand-in-hand with our user customers. But here we seem to be prizing the opposite—IS is kept in the back room until something needs to be switched on. Where's the cross-functional cooperation? Even the consultants the users brought in gave us a wide berth. This is partly the fault of the IS department—we were seen as the cause of the problem, since the old, inflexible systems were our doing. And most here would agree that we haven't been as proactive in working with users as we should be.



There's a lesson here for us and a warning for other readers. But I think corporate senior management is also to blame for not showing a commitment to partnering. Now, in lauding this user-driven effort, they are indirectly saying partnerships are not necessary for success. I think many of your readers may be encountering this and I'm interested to know how they handle the problem.

Hank Flannagan
Applications Director
DBO Inc.

SHARE CROPPERS

I worked on the development of an electronic archival records program at the National Archives of Canada and have been involved in information management for some time. Within an office setting, so much of how well a program works depends upon the information shared or not shared.

We're all familiar with the truism that "information is power." The saying I prefer, and which makes sense when you want programs to work, is closer to "information is only valuable if shared." Sharing information also reduces duplication of effort.

I am now involved in developing the Canadian federal government's agenda for action to do more business electronically by 1998. Sharing information and strategies is the most difficult part of the work.

Even when information management systems are easy to use, and no matter whether you are managing paper or electronic records, only people interested in sharing the information or keeping corporate memory submit documents for storage. Librarians are pretty good at organization and retrieval of information, but they can't make people share if they are not so inclined. When the technology people try to solve everything with systems, the terminology changes (search engines, information warfare) but the users still don't share the information.

Thanks for your articles; they are always informative.

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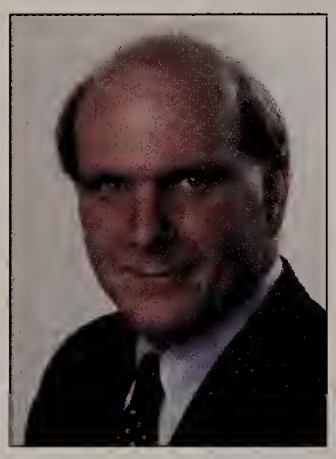

Steve Ballmer
Executive Vice President
Microsoft Corporation

There's no need to tell you that we're deep into the Information Age. The Web, e-mail, intranets, client/server applications — you've seen them all in your corporation. Or you've been concerned that you had to get them to stay competitive. But how do you cut through the noise and implement the best technology?

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Microsoft solutions deliver superior client/server performance at a low cost of purchase and ownership. With their intuitive user interface, Microsoft® Windows® technologies reduce support and training costs dramatically.

Windows is also a time-tested and proven platform for development, so you have the power of choice. Leading independent developers in every industry offer sophisticated line-of-business software for Windows. In addition, tight integration across Windows server products, and between server and desktop Windows systems, makes it easier to develop your own applications.

You'll also find that Microsoft® Windows NT® and the BackOffice™ family of server products interoperate smoothly with your legacy systems. That means you protect IT investments, even as you free up the flow of mission-critical information.

Of course, Microsoft's entire product line has been optimized to support corporate Internet and intranet solutions. From HTML editors to Web browsers to server software, Microsoft offers everything businesses need to build and maintain engaging, interactive on-line sites.

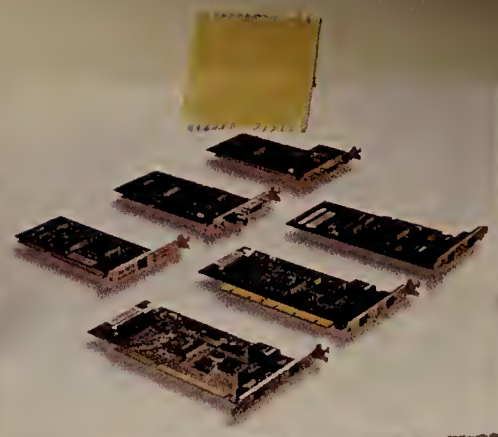
Simply put, Microsoft technologies make it faster and easier to get real business returns from every kind of information technology.

Microsoft — look again!

As an introduction to the Corporate Solutions Program, please take a look at the stories that follow. You'll see how Microsoft is helping corporations of all kinds turn their business goals into realities.

HP OpenView for Windows SNMP management platform, providing true, multivendor network management.

OPENVIEW



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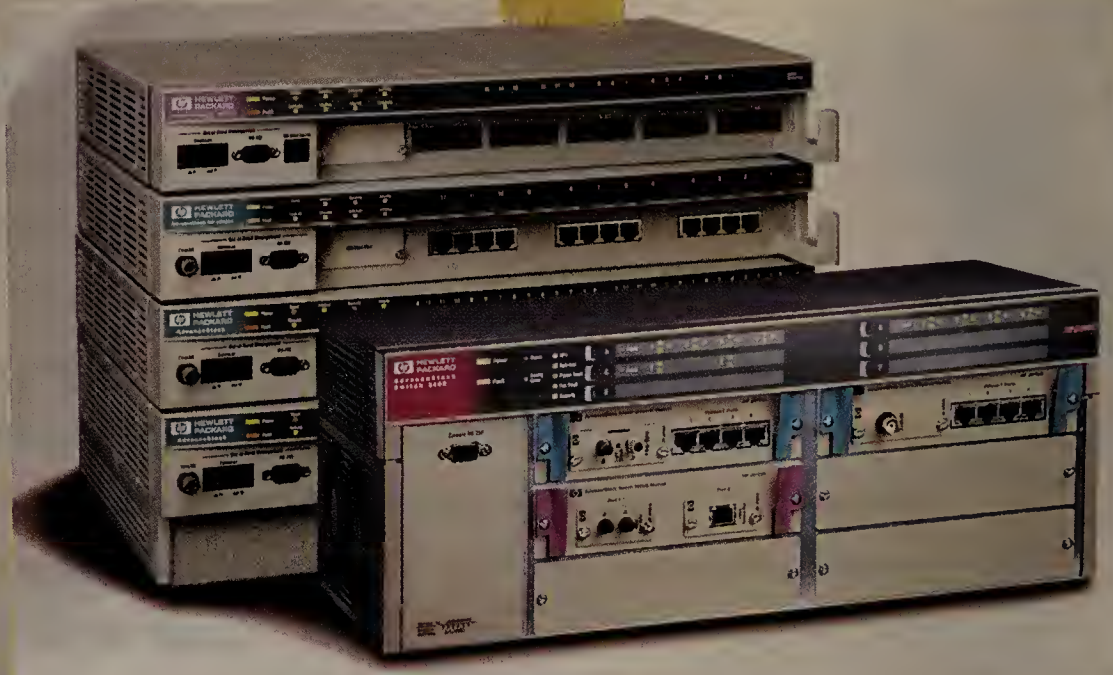

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Companies use Wang to improve business processes

For three companies, fewer people, fewer steps lead to more efficient customer service and better responsiveness.

"We made back our original $1 million investment in the AWS in just the first year."

As Microsoft's preferred provider of imaging and workflow software, Wang is uniquely positioned to help its customers improve their business processes. Wang's OPEN/image and OPEN/workflow products on NT offer scalability across the enterprise, the flexibility needed to easily integrate the system into current environments, and a platform that offers superior price/performance and power.

ConEd plugs into Wang

Customer service reps at power utility Consolidated Edison of New York used to manage more than 1 million pieces of customer correspondence manually each year. Managers had difficulty tracking the status of a given customer inquiry.

To alleviate the problem, ConEd implemented its Automated Workflow System (AWS), based on Wang OPEN/workflow and OPEN/image running on Microsoft® NT® and using Microsoft® SQL Server™.

The AWS is used by more than 600 customer service reps. "We manage our customer interactions more efficiently, involving fewer people in the process and fewer steps along the way," says Ed Glister, who led the deployment. "We're serving our customers better under the new system."

ConEd quickly recovered its substantial investment in software and hardware. Says Glister, "We made back our original $1 million investment in the AWS in just the first year, and estimate overall cost savings at over $2 million per year."

WANG

IGT hits imaging jackpot

International Game Technology (IGT) is a leader in the design, development and manufacture of microprocessor-based gaming products and software systems, such as slot machines and video poker systems.

Recently, IGT project leader Cindy Nelson and her team chose Wang's OPEN/image and OPEN/workflow running on Microsoft® NT® Server to replace an outdated imaging system that required IGT to maintain hard copy documents on-site as well as electron-

ically, meaning thousands in lost savings each year.

Since IGT had standardized on NT, it made sense to work with Wang. One example: Every NT user will be able to view, mail, scan and print imaging files using Microsoft® Imaging for Windows®, an imaging viewer developed by Wang and included as a standard component of Windows® 95 and Windows NT® Workstation.

The projects at IGT are still in the early phases, but Nelson is enthusiastic about the initial successes. "We can handle more volume with fewer people," she says. "We will be able to access customer information quickly, and increase turnaround, resulting in better service and responsiveness."

Nelson was highly impressed with Wang's service. "Wang clearly demonstrated their commitment to us," she says. "They set a new standard for how I expect other vendors to support us in the future."

Norwich Savings banks on Wang

"Wang set a new standard for how I expect other vendors to support us in the future."

The Norwich Savings Society, in Norwich, Conn., is using Wang OPEN/image to capture and manage documentation for individual retirement accounts.

"Previously, we relied on a bank of rotary files that covered the wall of a good-sized room," says Richard W. Dennison, senior VP of systems and operations at Norwich Savings. "With Wang OPEN/image, we plan to move the hard copy files off-site. Later, we plan to include processing of signature cards and safe deposit documentation."

Knowing that Microsoft and Wang are working together has had a major impact on Dennison's decision. "It was critical to know that both Wang and Microsoft planned future development relating to these products," he says. "Moreover, Wang and Microsoft are setting the open standards for imaging and workflow on NT, so we know we will be prepared for what the future holds."

"Wang and Microsoft are setting the open standards for imaging and workflow on NT."

Working together

As part of the agreement between Wang and Microsoft, which began in April, 1995, Wang was named Microsoft's preferred provider of imaging and workflow systems. The two are working together to offer the best open applications solutions from Wang for use on Microsoft® BackOffice™/NT.

Clearly, the alliance between Wang and Microsoft is already helping to define the market and set standards that help customers evaluate and select imaging, workflow and storage solutions.

This piece was written by Ellen Rome, director, Wang/Microsoft Alliance, Wang Software. Wang can be contacted at www.wang.com.

Software infrastructure helps New Brunswick Power move into a brighter future

With an eye to the long term, Canadian utility selects SAP and Microsoft as solution vendors.

New Brunswick Power has provided electricity to customers throughout its namesake Canadian province since 1920. It currently operates 17 generation stations.

Recent regulatory changes have led to a far more deregulated and competitive environment, prompting the utility to reevaluate its business processes, particularly its customer service functions. However, in the course of this reevaluation, the company quickly realized that its existing software and system infrastructure lacked the functionality and flexibility needed to meet its changing business needs.

By exploiting the robustness of SQL Server, New Brunswick Power was able to merge three inventory systems into one.

After comparing potential solutions, New Brunswick Power realized that its needs would best be met by implementing standard software applications on a client/server system. To ensure that the technology it chose would be viable for at least the next ten years, the utility decided on SAP R/3 and Microsoft® SQL Server™ with Microsoft's Windows NT® Server operating system.

New Brunswick Power chose SAP R/3 for the product's integration, as well as SAP's commitment to creating solutions geared to the utilities industry and its ability to provide ongoing support. The company deployed R/3's financial (FI), controlling (CO), materials management (MM) and parts of purchasing and accounts payable (AP) applications. "One of the major advantages in going with SAP R/3 was the integration across platforms," says Gerry Schwartz, manager of computer services for New Brunswick Power. "Also, we believe that SAP has demonstrated their long-term commitment to the product."

"One of the major advantages in going with SAP R/3 was the product's integration across platforms."

Microsoft SQL Server and Windows NT Server were also chosen by the utility with an eye to the future. SQL Server has been optimized to run on Windows NT Server and offers an integrated operating platform.

Implementing R/3 on Windows NT and SQL Server allowed the utility to reorganize many internal business processes. And by exploiting SQL Server's robustness, the utility was able to merge three inventory systems into one, eliminating data duplication and reducing inventory levels.

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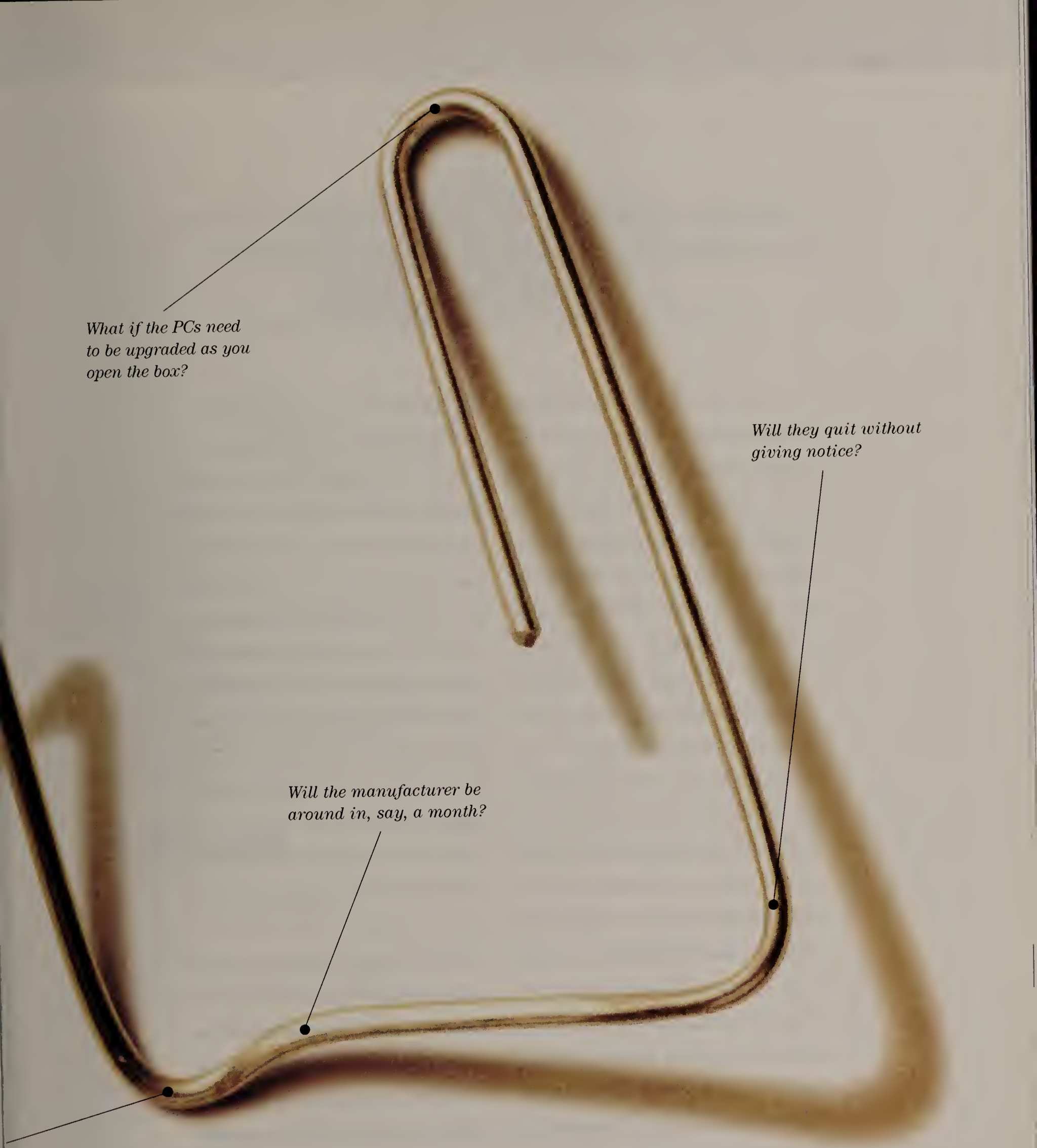
What if the PCs need to be upgraded as you open the box?
Will they quit without giving notice?
Will the manufacturer be around in, say, a month?

HEWLETT PACKARD

Verdict on dual deployment of Office Suite and PC DOCS goes in user's favor

The old adage about killing two birds with one stone helps a San Francisco law firm.

Morrison & Foerster, a San Francisco-based international legal firm, has experienced tremendous growth over the past ten years. To maintain its competitiveness, its lawyers had to reduce turnaround time on documents, had to be able to locate the latest copy of any contract immediately, had to know who had made what revisions to which document, had to have quicker access to case-related information, and had to do more with fewer administrative resources.

To achieve all this, the firm deployed NT as its network operating system, the Microsoft Suite of applications, and then decided to implement PC DOCS as its document management solution. Rollout of the technical infrastructure began in mid-April 1995, and was completed by mid-July.

"The added complexity of installing PC DOCS over Microsoft Office was not that great."

All in all, the firm rolled out 55 Microsoft® NT® servers and 1400 workstations to nine offices in less than three months. All the workstations were configured with PC DOCS and the Microsoft® Office Suite. The firm then added Microsoft® Mail and Microsoft® Schedule+. Training was completed during evenings, lunch breaks or on weekends.

Many law firms do not realize the need for document management until they have moved to their new personal productivity applications. Others elect to implement personal productivity tools, then implement document management over time. Morrison & Foerster opted to implement personal productivity applications in conjunction with the document management solution. "All too often, law firms do this as a two-step process," says Nancy Markley, director of technology. "But the added complexity of installing PC DOCS over and above Microsoft Office for us was not that great."

As users retrieve documents from the legacy system, the conversion utility translates the documents into Microsoft® Word and archives them on the PC DOCS system.

Despite its rapid deployment, Morrison & Foerster experienced little disruption. It also learned a key lesson for law firms: when moving to Microsoft® Windows®, do document management at the same time!

DuPont employs PC DOCS to streamline unwieldy documentation process

DuPont deploys Microsoft and PC DOCS products to meet its modest goal: becoming the most efficient company in the world.

DuPont and Co., a global chemical and energy corporation based in Wilmington, Del., had to get its many manufacturing facilities to meet the government's stringent regulatory policies and achieve ISO 9000 certification.

DuPont safety managers used to spend at least 30% of their time on paper issues; now they spend less than 15% of their time on the administrative part of the process.

Prior to PC DOCS, DuPont's internal plant operating policies were implemented under a manual process. A safety manager wrote a recommendation by hand, had it typed, then distributed it to the team for review. After all team members mailed back their edits on paper, the document was retyped and redistributed. Once approved by everyone, it was copied and disseminated to line managers for training. Finally, once training was completed, the recommendation was inserted into 14 binders for the documentation.

This process involved tremendous administrative overhead as well as many chances for making keying mistakes. In addition, the change cycle often took several weeks. DuPont deployed Microsoft® Windows NT® as a document management server and PC DOCS as its document management solution and changed all of this.

Safety managers now manage their recommendations in PC DOCS, then e-mail them to other team members, who make their edits electronically. PC DOCS automatically consolidates the team's input. Once the edits are complete, the file is printed and distributed to the line workers for training.

The result is that now, the safety team spends more time on content, accuracy and eliminating ambiguities in the text. Safety managers used to spend at least 30% of their time on paper issues; now they spend less than half that on the administrative part of the process. In addition, it used to take as long as five hours to locate specific regulations. Now, with PC DOCS, any document can be found in less than five minutes.

It used to take as long as five hours to locate specific regulations. Now, with PC DOCS it takes less than five minutes to locate any document.

These two PC DOCS case studies are excerpted from the ROI study Redefining Document Management, written by Scott McCready of IDC/Avante Technology. For a free copy of the full report or for information on PC DOCS, call 800-933-3627 or visit our Web site at http://www.pcdocs.com

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HP PCs For Small Business

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HP and Microsoft: A relationship for the long term

Benefits to the customer of this type of relationship include confidence, ease of integration and migration, and support.

As the demand for easy interoperation overwhelms every other consideration in the PC world, it has become common for companies to develop partnerships aimed at solving specific problems or redressing specific technological shortcomings on both sides.

The relationship between Hewlett-Packard and Microsoft is different. It is neither a tactical agreement to address limited technical issues, nor a way to fill technological gaps. It is a long-term working relationship that is focused on delivering better performance, ease of use, and value to customers. Now more than 10 years old, this relationship has extended into almost every facet of each business: from development, through marketing and sales, to distribution and product support.

The relationship between Hewlett-Packard and Microsoft is a long-term working relationship that is focused on delivering better performance, ease of use and value to customers.

This kind of close interrelationship offers three benefits to the customer. First is confidence. Customers buying HP PCs and servers know that not only have these platforms been designed and optimized for Microsoft operating systems, drivers, tools, and utilities, they are also certified by Microsoft, thus ensuring that the customer has an excellent out-of-box experience with that system.

Second is ease of integration and migration. Hewlett-Packard understands Microsoft technology so well that HP can develop PCs to be up and running in Microsoft and Novell networking environments faster and more smoothly than anybody else. And if customers want to migrate to a 32-bit operating environment like Windows NT®, they can find PCs for all mainstream, advanced and expert users, and know that not only will the hardware platform be impeccably designed for that OS, it will also be supported by a support organization with global reach.

Support is the third major benefit resulting from HP and Microsoft's close cooperation. If you are an MIS manager concerned about support, HP and Microsoft make it possible for you to have essentially any option you want. You can do the support yourself, of course, or outsource it, or call HP for support of either the platform, or the system software, or both. HP has a support

organization trained in supporting Microsoft software, and its sales organization is licensed to sell Microsoft support as well.

Two examples of the HP/Microsoft synergy are found in the HP Vectra XW Personal Workstation and in HP JetAdmin for Windows 95. A workstation based on Windows NT and the Intel Pentium Pro processor, the HP Vectra XW is aimed at professionals in the growing scientific and design markets that have accepted Windows NT-based workstations. This expandable machine is configured with one or two 200MHz Pentium Pros, a 3D graphics accelerator with the OpenGL acceleration, and plenty of memory. All this power is available to engineering and design users who are ready for Windows NT and are looking for price/performance levels never seen before. It is made accessible through the Microsoft Windows NT OS and symmetric multiprocessor support.

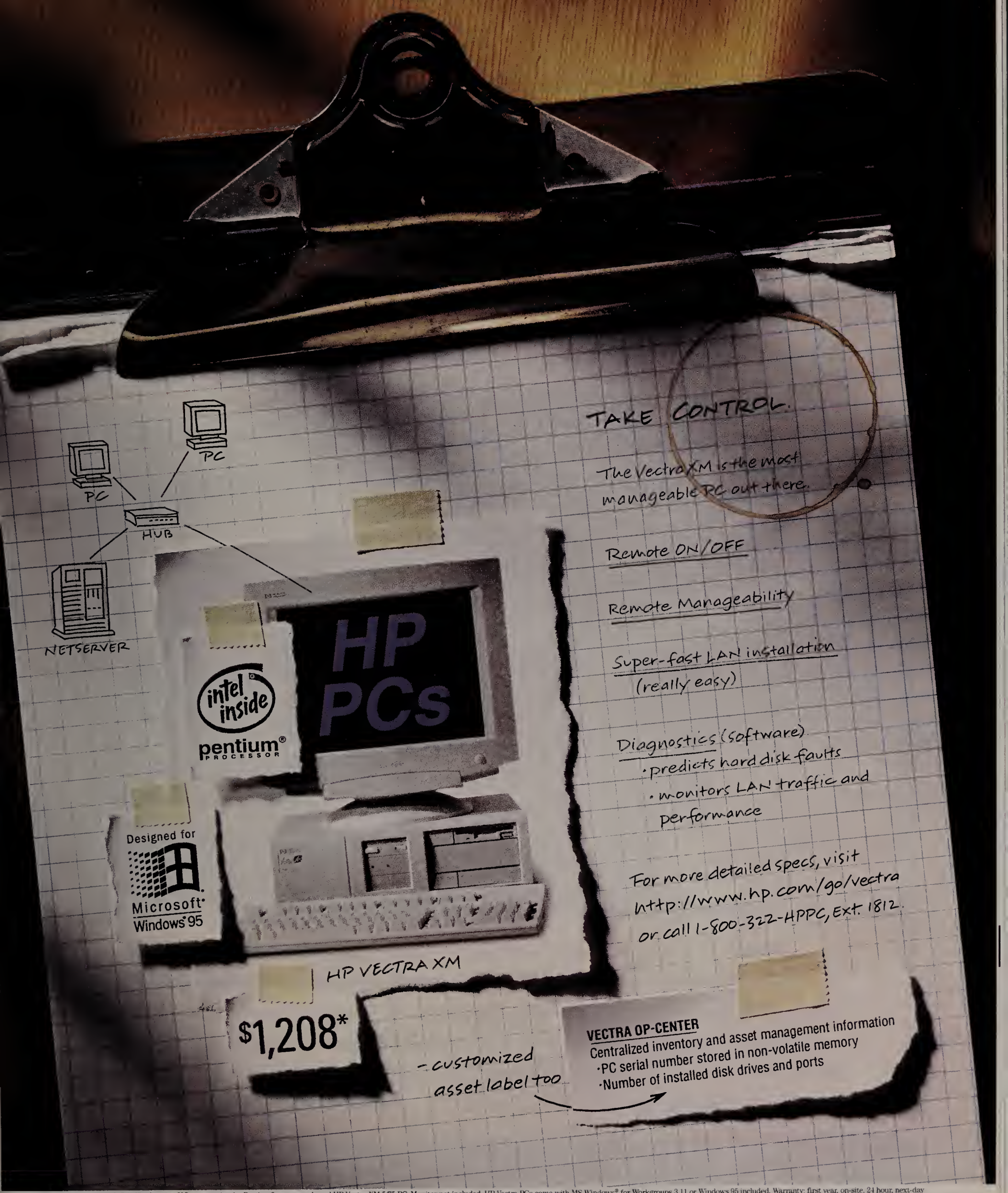
JetAdmin for Windows 95 is an example of a different kind of synergy. This utility developed by Hewlett-Packard greatly simplifies the management of networked HP printing resources. It is usually supplied by Hewlett-Packard in a number of ways. In this case, however, Microsoft has decided to bundle JetAdmin with every copy of Windows® 95 that they ship. This is a testament to the closeness of the strategic relationship between the two companies. Because if a person looks at Windows 95, they see a lot of Microsoft-developed software, but they generally don't see many OEM products running in there — except HP's JetAdmin.

Ahead of the curve

Other examples of the collaboration between HP and Microsoft include typical beta programs and extremely atypical marketing programs (such as cooperating on the launch of Windows 95/Success Express Tour), and sales programs that include everything from joint sales calls to a regular video-broadcast program designed to share time-critical information between the two sales forces. For the future, HP has made a significant commitment to the development of the Next-Generation Hardware Platform. The success of this effort will depend on how well the hardware and systems software and applications software work together. Customers want more power, but they don't want to sacrifice the applications productivity and stability they now enjoy.

Customers want more power, but they don't want to sacrifice the applications productivity and stability they now enjoy.

As the industry moves to this new platform, HP's close working relationship with Microsoft will help ensure that HP customers are well ahead of the curve in making this new generation of functionality an integral part of their systems environments.



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Software Spectrum teams with Microsoft to help firms making transition to Exchange

Workshops help users with the planning necessary to minimize interruption of critical communications applications.

Software Spectrum is working with Microsoft Consulting Services (MCS) to offer workshops on Microsoft® Exchange Server. The three-day workshops are designed for IT managers and staff from companies preparing to move to Exchange, and include Technical Solution Briefings on Exchange Server technology and its potential.

Exchange Server, a global messaging solution with built-in groupware and application development tools, "lets businesses combine all e-mail, groupware and Internet connectivity on a single PC platform," says Software Spectrum Technology Services Group president Link Simpson. "The result is seamless messaging worldwide."

But, he adds, "This robust server solution requires comprehensive planning to minimize the interruption of critical communications applications." This is why TSG and MCS have developed a methodology to shorten the Exchange Server implementation process. The workshops include three days of analysis of individual corporate needs, how-to discussions on installation and deployment, plus development of site plans, domain structure and cost modeling.

Steve Lewis, director of information systems for Fried, Frank, Harris, Schriver and Jacobson, a Manhattan-based law firm planning 1,400 seats of Exchange Server, took part in a pilot workshop this summer. "It was very helpful," he says. "It set our expectations more realistically in terms of what we'd have to do to lay the groundwork and clean up our current domain structure."

"It set our expectations more realistically in terms of what we'd have to do to lay the groundwork."

Headquartered in Garland, Texas, Software Spectrum provides customers with a variety of business software products and software licensing services, and assists them in the implementation, deployment and support of their computing strategies. Its workshops, which are limited to 10 attendees, are held at TSG's 12 locations: Atlanta, Chicago, Dallas, Detroit, Denver, Houston, Los Angeles, Minneapolis, New York, San Francisco, Seattle and Toronto. Price is $2500 per participant or $4000 for two people from the same organization. To register, call TSG at (800) 624-2033.

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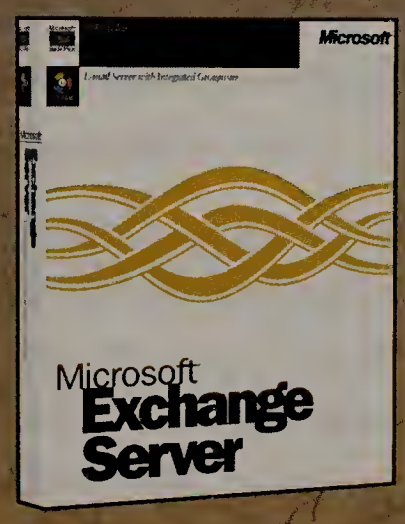

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FileNet and Microsoft — together, they're making it easier to manage documents

With more organizations moving to NT, FileNet Corp. is positioned to provide them with a suite of products to leverage their investments.

Microsoft and FileNet are making it easier for users to manage documents stored anywhere across the enterprise. The two companies have announced a relationship that includes product development, marketing, support and service initiatives, giving business decision makers and IT managers greater access to a range of Microsoft platform-based products from FileNet.

FileNet has the largest installed base of enterprise document management solutions on the Windows NT Server platform.

The move makes sense. FileNet has the largest installed base of enterprise document management solutions – some 2,500 systems – on the Windows NT® Server platform. As more and more organizations move to Windows NT, FileNet is positioned to provide them with a suite of workflow, document imaging, document management and COLD (Computer Output to Laser Disk) products to leverage their investments.

These products comprise FileNet's "Foundation for Enterprise Document Management" and enable organizations to manage information in any form, including text, scanned images, faxes, spreadsheets and video, says Ted Smith, FileNet President and CEO. "It makes the information available anywhere in an organization, including via Intranet and Internet applications."

"Our enterprise relationship with FileNet is a reflection of Microsoft's commitment to partner with the leading companies in their respective fields," says Jeff Raikes, Group Vice President of Sales and Marketing at Microsoft. "FileNet brings to this relationship a targeted market focus and an extensive solution suite for managing, accessing and sharing all information across the enterprise. The company also has a strong Windows NT focus, and a large customer and reseller base that makes it an excellent long-term partner for Microsoft."

FileNet is also offering a seminar series – In Focus – that will be conducted in cities across North America through 1996. For more information, call 1-800-FILENET (345-3638) or 714-966-3400, or visit our web site at http://www.filenet.com. For the seminar nearest you, see the registration certificate on the next page, or call 1-800-544-8456 to register.

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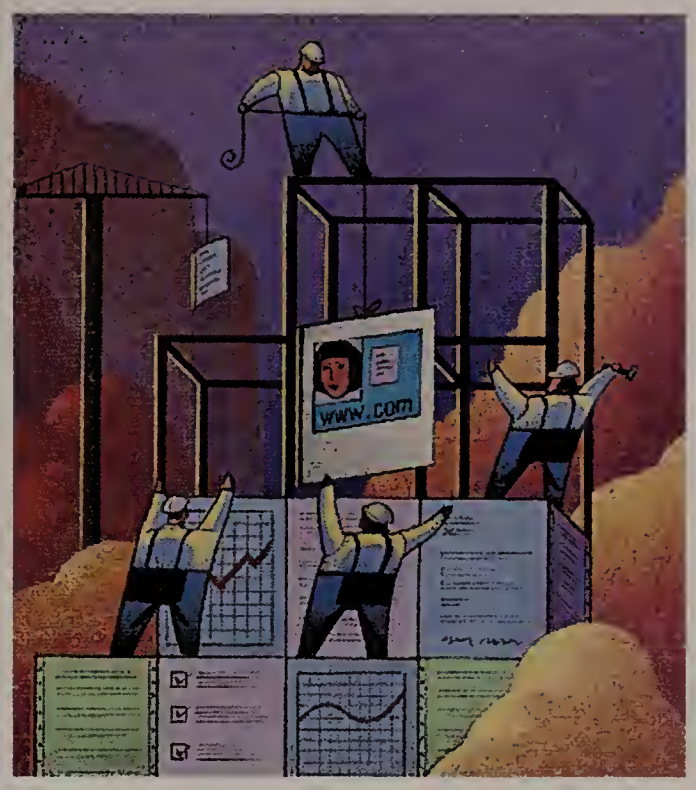

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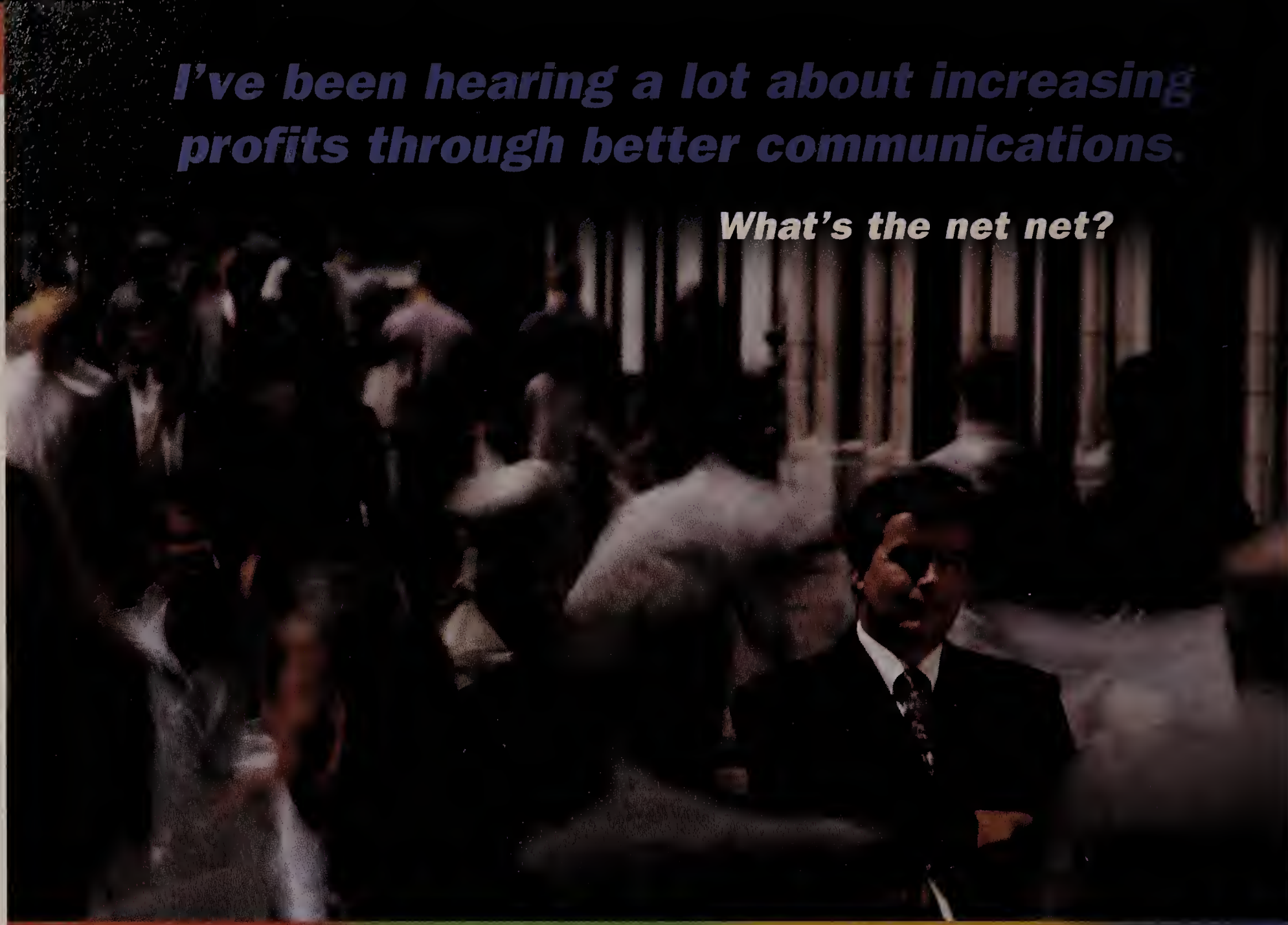

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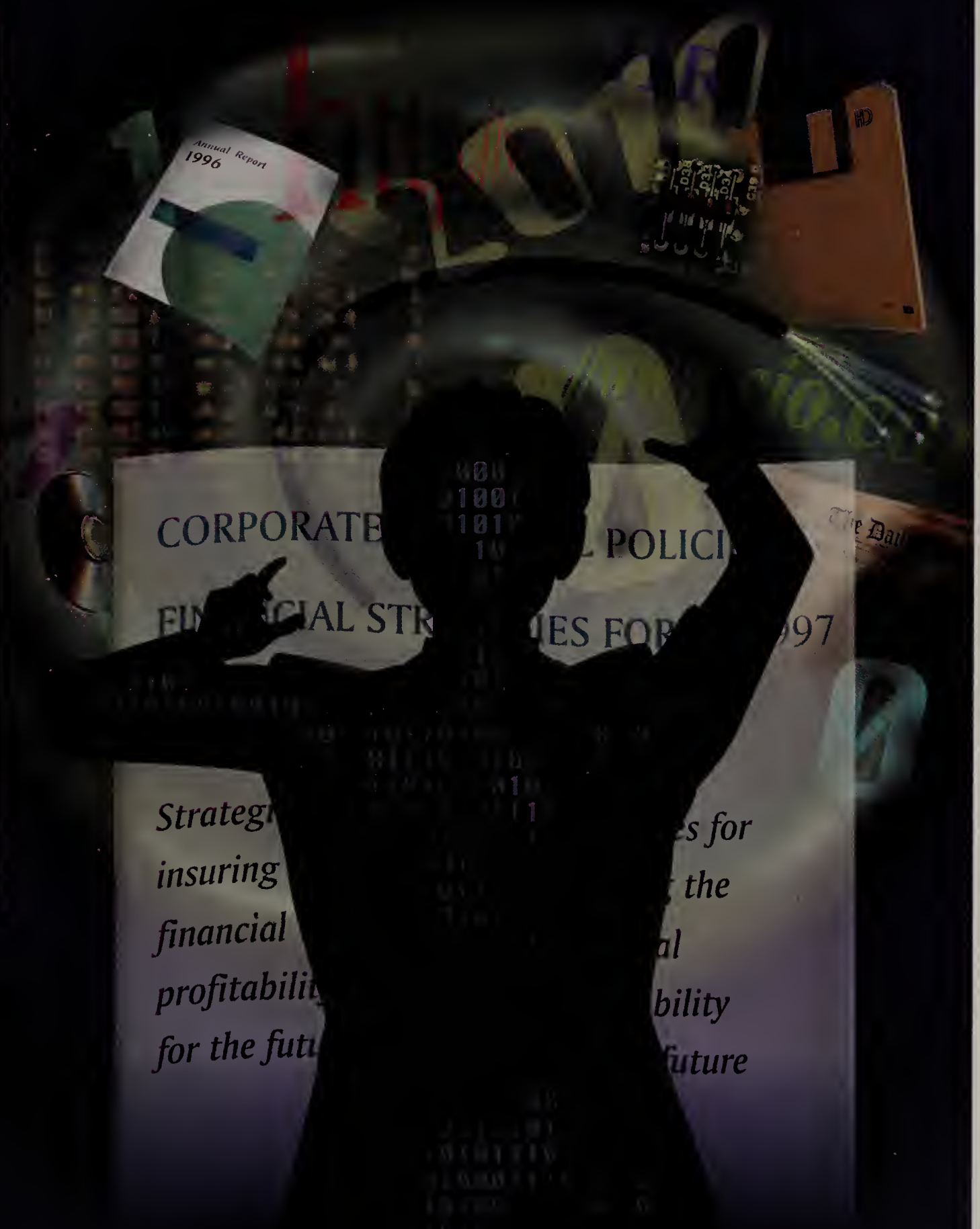


Leading the Charge in Turbulent Environments

IT as a Change Catalyst

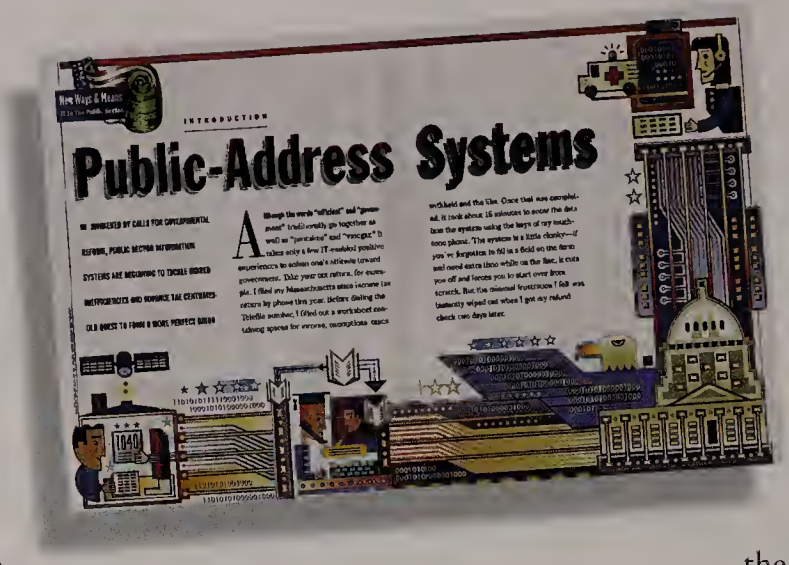
In Box

PUBLIC UTILITY

I write to commend *CIO* for its coverage of IT as a valuable tool for restoring the public's faith in government (July 1996). Too much ink is spilled these days bashing the government for being unresponsive and for having little of value to offer the taxpaying public. It was refreshing to see that something positive can be said about the small and large revolutions taking place in the public sector through creative applications of information technology. Still, I couldn't help noticing your introduction made the obligatory nod to the stereotype, throwing up the old oxymoronic reference to "efficient government."

Anyhow, keep the coverage going! (I was heartened to see the government resource area on your Web site recently.)

Robert L. Gladdings
Fairfax, Va.



INFORMED REFORM

I enjoyed your excellent issue on IT in government, in particular the roundtable on IT management reform ("Rethinking the Way Government Works," July 1996). I'm happy to see that federal, state and even local governments are finally thinking about the ways they can deliver better information management capacity.

George Lacey
Portland, Ore.

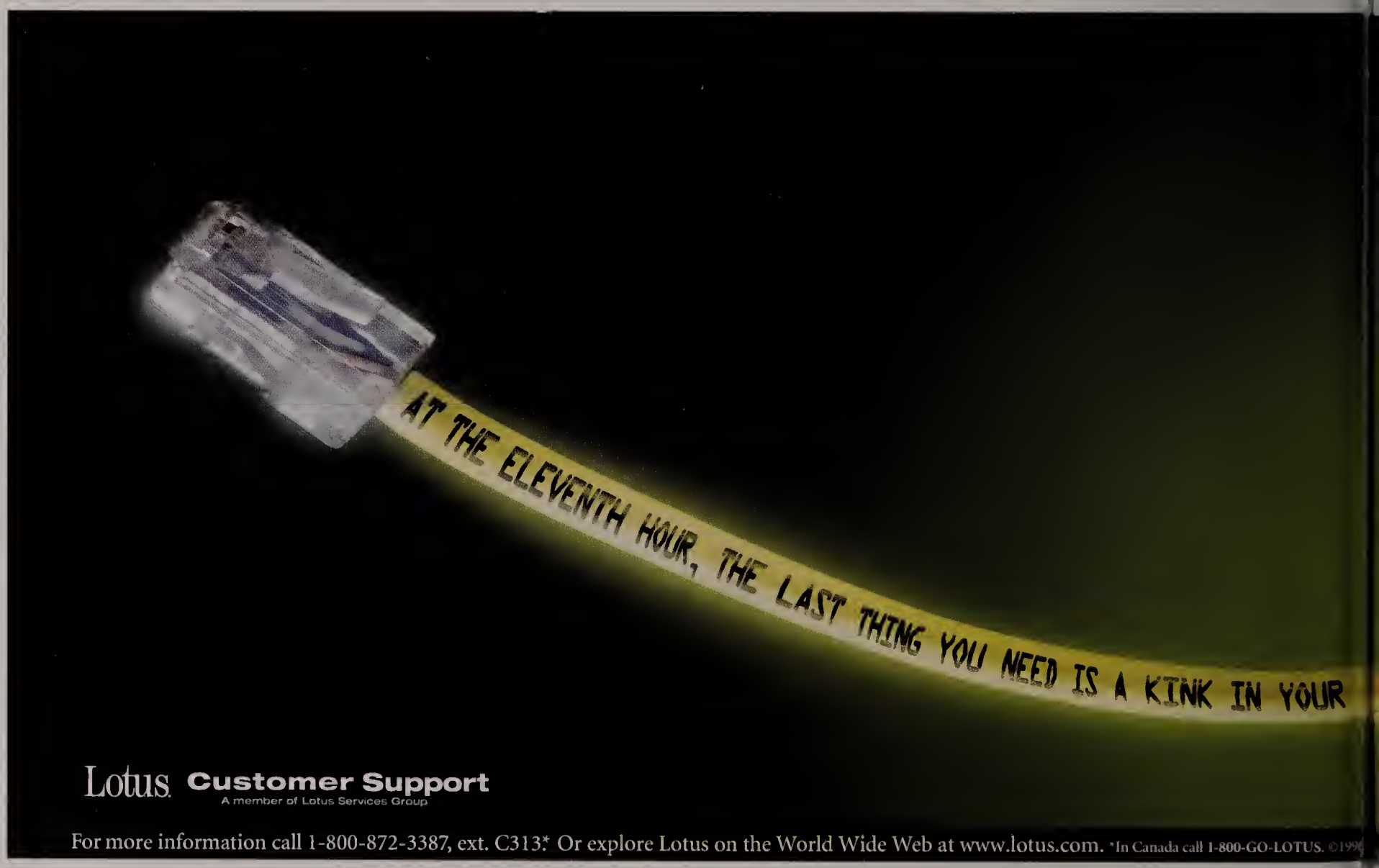
THE GLOBAL IMPERATIVE

Congratulations on your recent article "The Global Imperative" by Anne Stuart (August 1996). I found the information to be extremely timely and informative. New markets, new technology and new sources of brainpower across the globe are forcing businesses to fundamentally change in order to compete. Success in the business world will increasingly depend on the ability to gather, process and communicate information quickly and effectively to anyone, anywhere.

Jimmy A. Castro
Member
Greater Austin Chamber of Commerce
Austin, Texas

GLOBAL OVERSIGHT?

I read with interest—and dismay—your recent "World Leaders" special issue (August 1996). Its apparent objective was to honor global competitors, yet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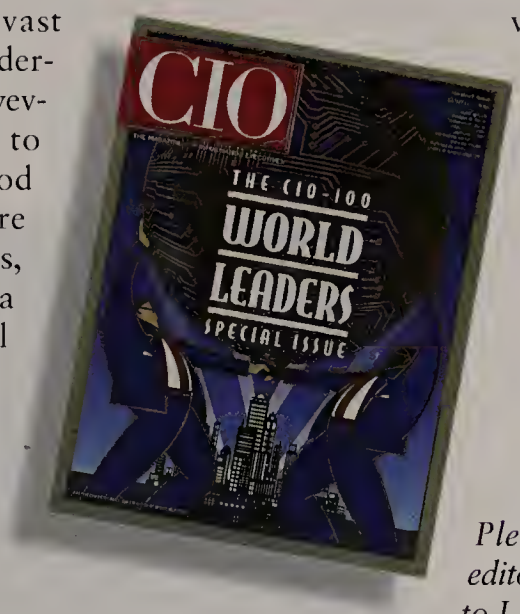
there was not a single unit of government, at any level, represented on your list of 100 honorees. I would think you might find some notable examples of innovative governmental action and initiative among the states and nations of the world. (Singapore, for example, comes to mind when thinking of bringing to bear the resources of a government to enhance a nation's stature and competitiveness.) It seems to me a significant omission. Maybe next year?

Desmond J. Galassi
Newburgh, N.Y.

NO SMALL COMFORT

As the founder of a small (20-person) startup, I looked in vain in your "World Leaders" special issue for advice for the small-business person trying to set up a "virtual" global shop. I can, and will, modify some of the techniques used by the larger companies profiled in your stories, and I understand that these represent the vast majority of your readership. Sometimes, however, paying attention to the little guys is a good exercise in taking care of future "big" readers, as well as presenting a well-rounded editorial product.

Leslie Barnes
Silver Spring, Md.



CLARIFICATION

Thanks so much for selecting GE Capital Services as one of *CIO*'s top 100 World Leaders. At GE Capital, we're very focused on creative application of technology to grow our business. We're also just as proud of the revenue we generate. In that regard, we would like to point out that the $2.4 billion reported for us was our net income in 1995. Our revenues were in excess of $30 billion.

Thanks again for our award and for continually delivering a great magazine.

John A. McKinley Jr.
Chief Technology and Information Officer
GE Capital Services
Stamford, Conn.

Please send letters to the editor to letters@cio.com *or to Letters, CIO Magazine, 492 Old Connecticut Path, P.O. Box 9208, Framingham, MA 01701. Letters may be edited for length or clarity. If you welcome feedback from other readers, please include your e-mail address.*

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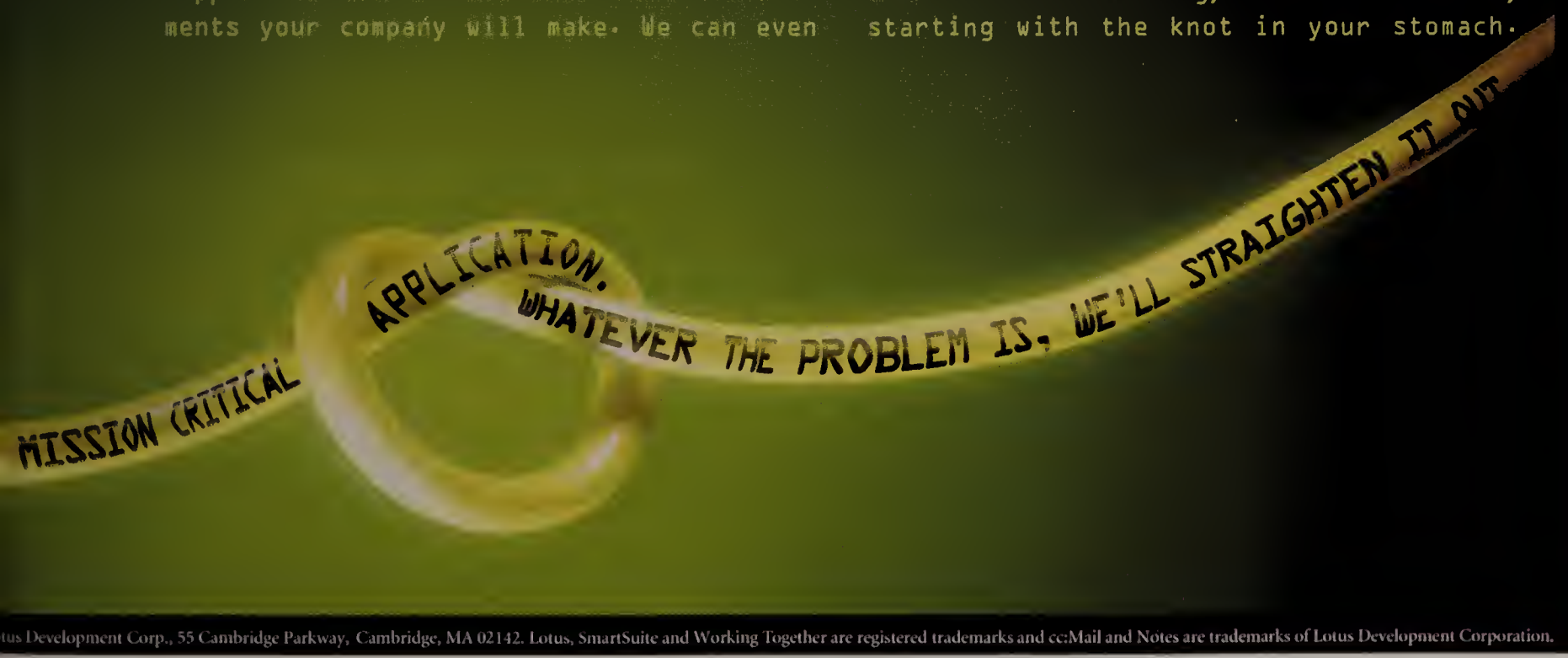

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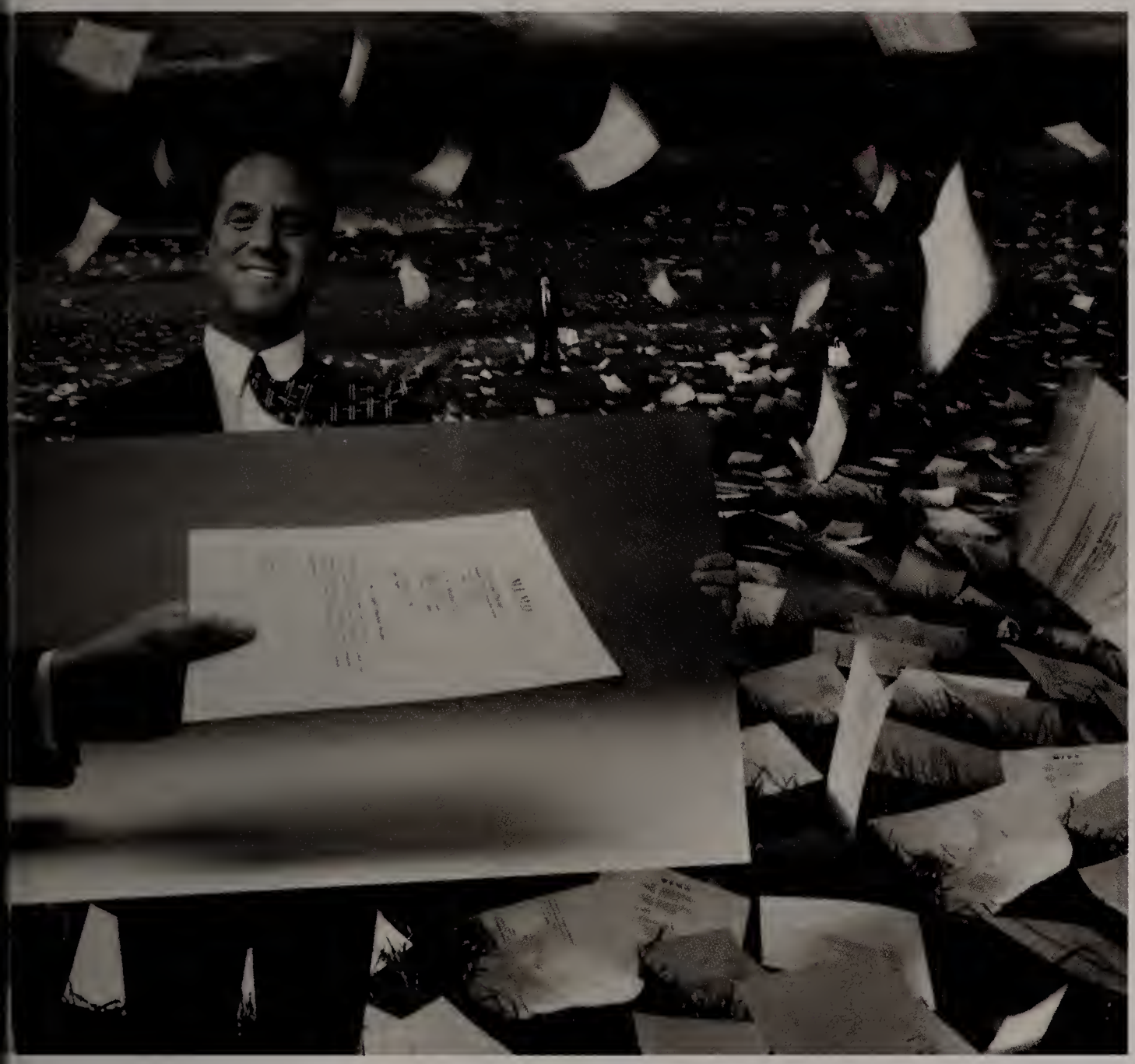

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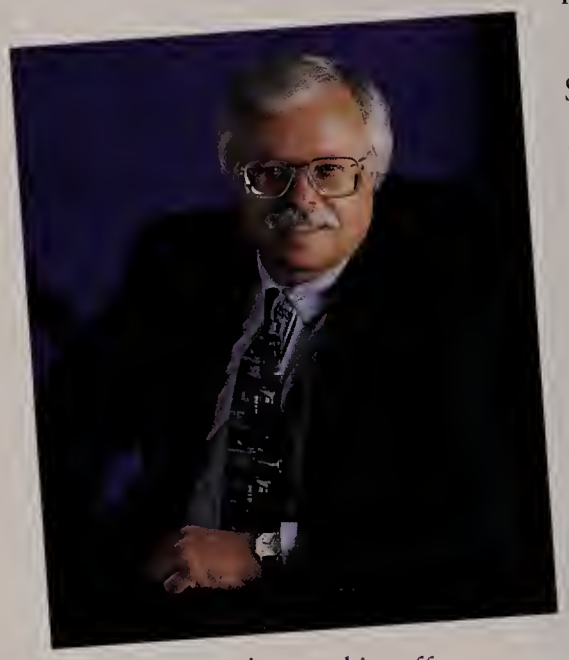
Publisher's Note

How do you value your IT investments?

Does top management share your opinion? For the answers to these and other questions, I suggest you immerse yourself in a practical study of the value of IT. At the CIO Enterprise Value Retreat you will meet and work with a distinguished group of business executives, senior IT practitioners, business school leaders and heads of technology companies.



CIO Communications and its partners, AT&T Solutions, Acxiom Corp., Booz, Allen & Hamilton Inc., Data General Corp. and Texas Instruments Inc., will host the fifth annual CIO Enterprise Value Retreat from Feb. 2-5, 1997.

Led by F. Warren McFarlan, Harvard Business School's senior associate dean, director of research and Ross Graham Walker Professor of Business Administration, you will participate in a real-life case study designed to take you through the often tangled path of information technology implementations. The case study highlights a technology adoption decision and its effects on an organization's profits.

You will learn how to justify a project's costs, budget effectively, sell ideas to internal management and users, and understand the strategic enterprise implications of your decisions. The bottom line: This retreat will teach you to manage the process of creating effective information technology systems in your own organization.

As a participant, you will be our guest at the CIO Enterprise Value Awards ceremony, underwritten by AT&T Solutions, which honors executives for their achievements in obtaining ROI from information technology.

Last February, CIOs from companies such as Borden Inc., SmithKline Beecham, Massachusetts General Hospital, Amdahl Corp., Allied Van Lines Inc., Walt Disney Picture and Television Co., Boise Cascade Corp., McDonnell-Douglas Corp., Wal-Mart Stores Inc., Budget Rent A Car and American Express Co. Inc. were privy to the most innovative thinking in ROI from information technology. This February, *you* can join this prestigious roster of IT leaders and learn the latest in evaluating the value of IT.

The CIO Enterprise Value Retreat will be at the Ritz-Carlton Laguna Niguel in Dana Point, Calif. To enroll, call 800 355-0246 or visit our Web site at *www.cio.com*.

Kathryn L. Walz

P.S. Have you joined the CIO Inner Circle? It's easy. It's free. Simply key in your subscriber ID number at *www.cio.com*. Inner Circle members have access to our Online Feature Forums, archived articles, seminars and more.

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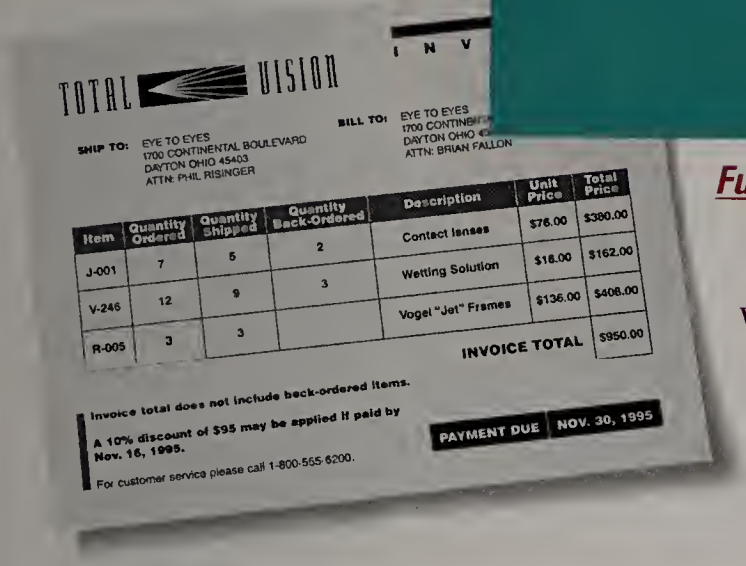
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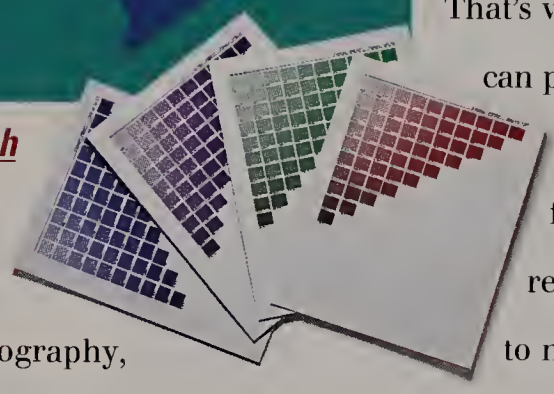

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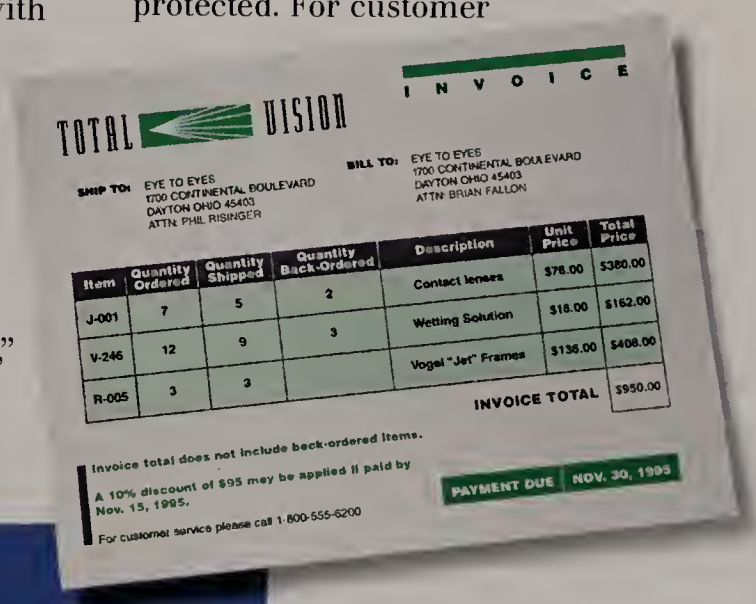
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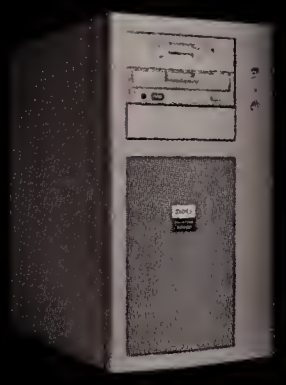

Introducing the PowerEdge 2100: Redefining the entry-level server.

Investment Banks Jump On Public Offering Of Dell Servers

3 of 4 Top Firms Report Improved Network Performance

Wall Street may be feeling a bit queasy, but it's definitely a bull market for Dell.

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"It might seem surprising," said one source. "When people think of Dell, they think of desktops and portables. But Dell's adherence to open network standards makes their servers a natural on large corporate networks."

It also makes Dell unusual among its competitors, most of whom are only now beginning to abandon their proprietary standards in favor of a more open approach. "I don't want to name names, but companies like Co

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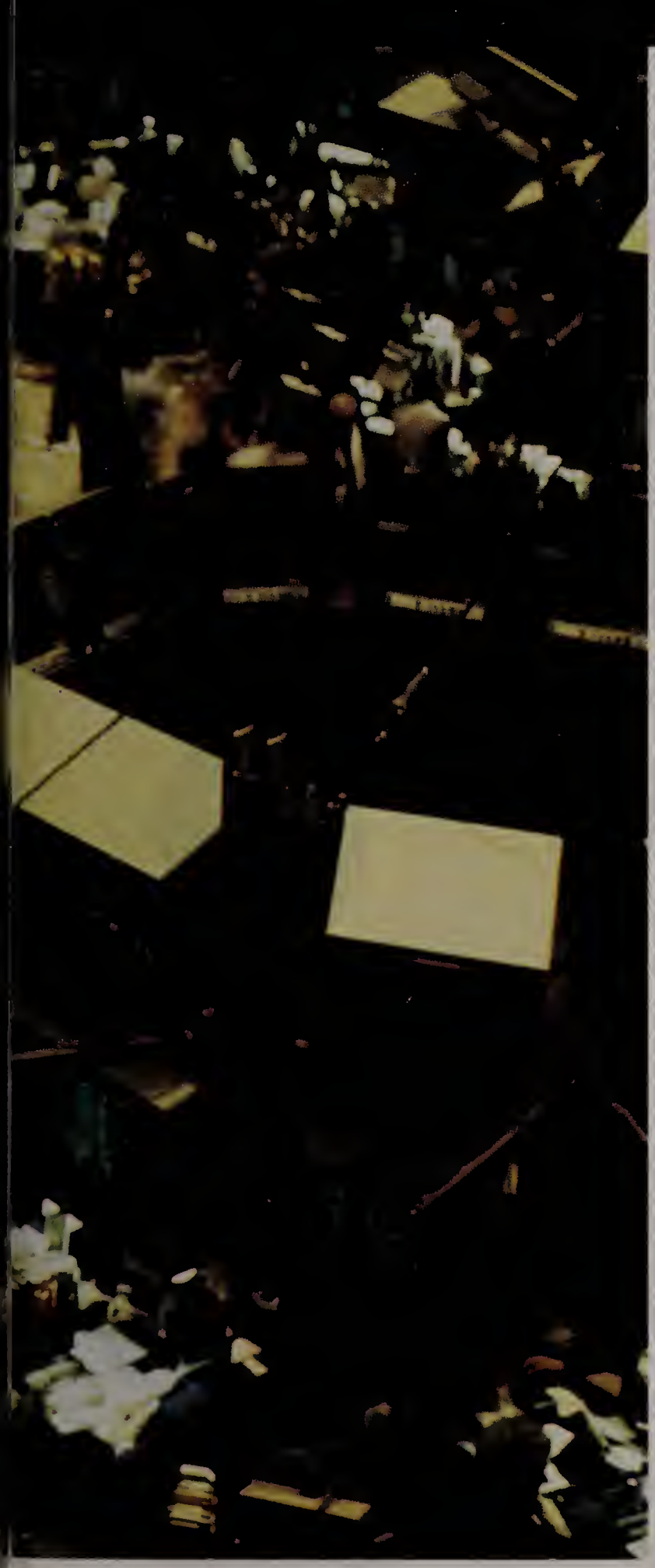
The following could be considered insider information. Run with it.

- Dell is ranked fifth in US server market share
- Dell servers are built in a dedicated ISO 9002 server factory
- Mission-critical server support is provided 7 x 24
- 92% of Dell's $5.8 billion revenues come from businesses and government agencies
- 5 of the top 6 software makers buy Dell servers
- 5 of the 6 largest automobile makers buy Dell
- 4 of the 5 largest mutual insurance companies buy Dell
- 5 of the Big Six accounting firms buy Dell



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Edited by Cheryl Dahle

I May Be Poor, But I'm Number One

MARKETING Making money is the be-all and end-all of any business, right? Well, not if you're a marketing manager. According to a study by professors J. Scott Armstrong of the University of Pennsylvania and Fred Collopy of Case Western Reserve University, marketers forgo dough for the esoteric pleasure of being number one. Subjects in the study were asked to price a new product by choosing between high prices and high profit or low prices and low profit but with the largest market share. Sixty percent of them sacrificed profitability for the competitive edge. "Their desire to be number one outweighed their economic rationality," says Armstrong. But here's the kicker: CIOs might be partially to blame for this misplaced competitiveness. Marketing managers get so much information nowadays that their priorities become hazy, Collopy says. In the past, marketers made decisions based on data about their own company and products. Now with the avalanche of information available through technology, they have massive amounts of data about their competitors' information that they just don't need and probably shouldn't have.

World Wide Wasteland

WEB SCHLOCK *Help! My work schedule keeps me from watching Ricki Lake! What ever can I do?*

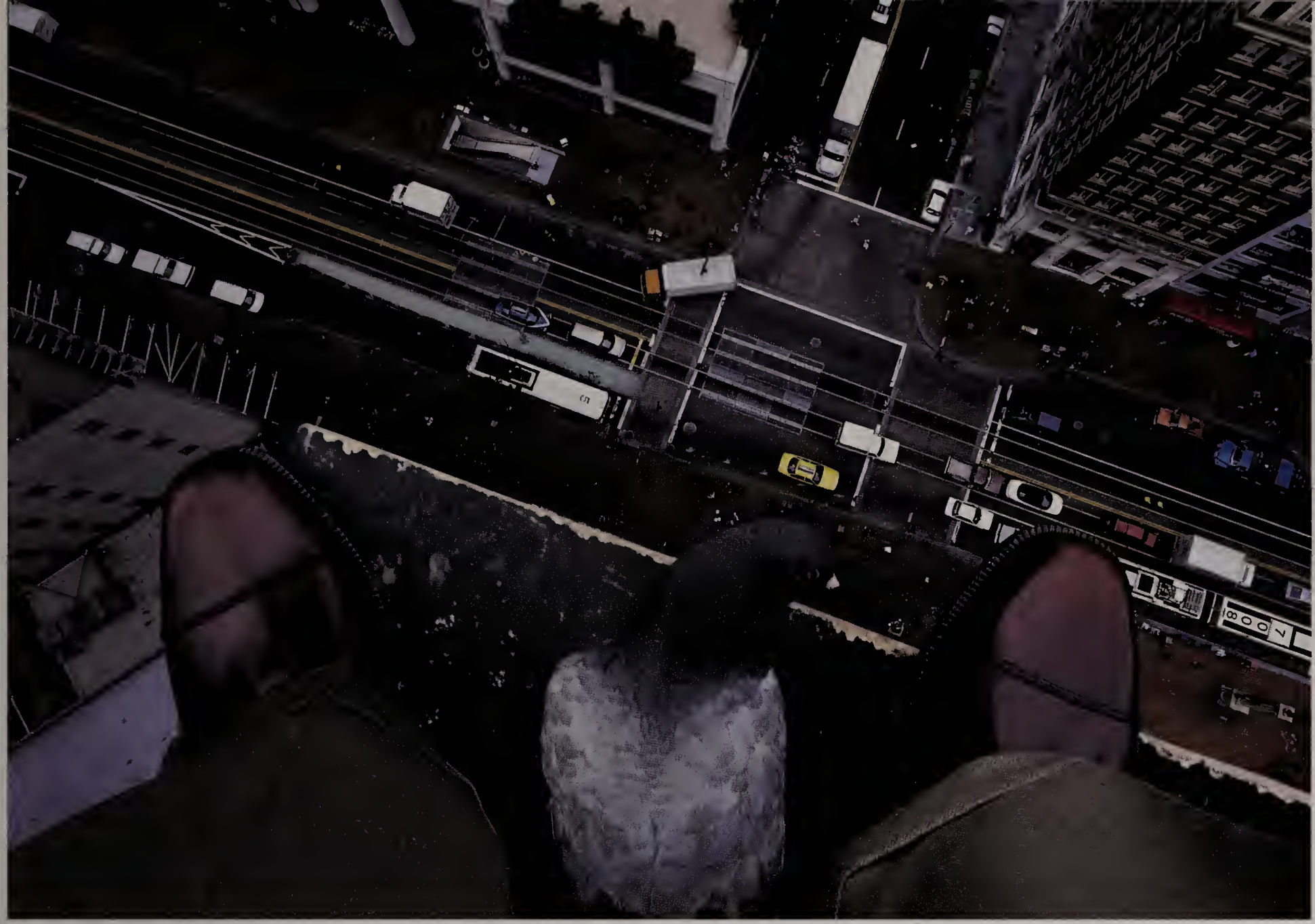
Sound familiar? Now, thanks to the online talk show Other People's Problems, office-bound voyeurs can see the seamy side of life without turning on the tube. Touting itself as "Dear Abby meets MTV," the Paramount Digital Entertainment venture features daily discussions of problems experienced by Los Angelenos who spill their guts to the show's intrepid reporters. A recent site visit revealed that Patty is living with her straight gay-porn-star boyfriend but told her parents she's living with Susan, with whom she is actually having an affair. Visitors are invited to offer Patty advice via e-mail or respond to a poll about how to deal with the tricky situation. In addition, they can solicit advice, offer wisdom to those in need or browse through the Problem Pit archive to check out problems they may have missed.

Adding his two cents to the dilemma du jour is the site's "cyberhost," actor Larry Toffler (you may recognize him from such roles as young Roger on *One Life to Live* or from his cameos on *Knots Landing* and *Doogie Howser, M.D.*). He weighs in at the end of each guest's litany with insightful comments, like this one to a woman who felt violated because her apartment was burglarized: "I think my girlfriend has the same experience after we fool around."

Eventually, the show will add real-time interviews and commentary for America Online subscribers.

For a glimpse of Other People's Problems, visit *opp.paramount.com.* ■

ILLUSTRATION BY ROBIN JAREAUX. COLLAGE BY JOAN HALL



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Trendlines

The job of the CIO, says Collopy, is to filter the important information from the dross. "If you give decision-makers information, it appears they use it," he says. "So the information providers can help companies by thinking about whether that information is relevant and useful to the decision that will be made. That's good news for the right CIO. It says there's an opportunity for higher professionalism." ■

Send Out the Clones

CELLULAR PIRATES On certain street corners in New York, Los Angeles and most other major American cities, you can find "the phone dude." For a few bucks—cash—he will connect you to your relatives in Bangkok, your buddies in Bologna or your business associates in Odessa. The phone dude's competitive advantage is that his supply chain origination point is an old business technique called "smash-and-grab." His rates are so low you'll think they are a steal.

In fact, they are. Estimates of how much of a steal range from $500 million to $650 million taken last year from the coffers of the cellular industry. Deactivation of a cellular device only saves one account; with a not-so-sophisticated scanner that snatches signals between cellular phones and transmitting towers, cellular pirates re-

> "The virtual environment finds its own organization. E-mail goes through an organizational chart like a meat grinder."
>
> *–John Perry Barlow*
> Cognitive Dissident and Vice Chairman, Electronic Frontier Foundation

Findings **Retail Technology**

More Power to Ya

The CIO role in retail companies has a bit more heft to it these days as retailers body-slammed by a tough economy look to data warehousing and other such technologies for help. That's the conclusion of Computer Sciences Corp.'s (CSC's) sixth annual Retail Technology Survey, which tracks IT trends in the industry. This year's edition garnered 295 responses from retail executives.

"IT expenditures are rising faster than others because [retailers] are recognizing IT as one of the key ways to create value," says Steve Biciocchi, a partner at CSC's Consumer Goods/Retail Practice, based in Cleveland. Forty-five percent of the respondents said their IT budgets are on the increase, while 17 percent said they are shrinking. That shift allocates more clout as well as money to the CIO. "The overall corporate influence of the CIO is upward bound," Biciocchi says.

One of the rising-star technologies that retail CIOs are choosing is data warehousing, which was voted one of the top five "hottest technologies" for the first time in the survey. Retail execs are using sales information stored in data warehouses to forecast business directions and analyze buying patterns to meet customer needs more effectively. The technology driver in the mix is the advent (finally) of mature warehousing software. "I think there may be some more credence given to package-based capabilities," says Biciocchi. "Those things had a hard time being implemented in the past because you really needed a pretty robust warehouse and toolset."

The Hot List

Retailers pick the top five technologies

	'96	'95	'94	'93
Executive information systems	1	1	1	1
Document/workflow management	2	2	4	3
Data warehouse	3	*	*	*
Imaging	4	3	5	3
Consumer-specific databases	5	*	*	*

* NOT RANKED AMONG TOP TECHNOLOGIES OR TOP APPLICATION AREAS THAT YEAR
SOURCE: CSC

But these more powerful IS pros still have their work cut out for them. A third of respondents said they do not have an effective strategy for managing their legacy systems, and 42 percent lack a good strategy for supporting process change. Sixty-one percent said less than 10 percent of their stores' ordering is done via EDI. Thirty-nine percent do not even use scanner data for ordering purposes—despite the fact that inventory was rated the most critical business function by nearly half the executives.

To obtain a free copy of the study, call CSC at 800 272-0018.

–Derek Slater

ILLUSTRATION BY ROBIN JAREAUX

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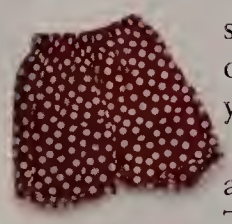
Trendlines

program stolen telephones. Before you can say "Information please," the resulting "clones" are back out on the street, being sold for $75 to $300.

Naturally, this thriving entrepreneurial opportunism doesn't exactly have cellular companies leaping with joy—and they're doing something about it. Recently, the good guys at Pacific Bell Mobile Services and GTE Mobilenet in Santa Barbara, Calif., announced they are making available digital encryption technologies for their cellular units, creating so-called "smart phones" not susceptible to cloning. In certain markets, AT&T Wireless Services Inc. offers "authentication" services, which lets encoded passwords travel between an individual telephone and a network. L.A. Cellular Telephone Co. offers a fraud protection feature that lets customers lock and unlock a cellular account with just a few button taps. And some systems will be relying on "radio fingerprinting;" if an electronic fingerprint doesn't match the serial number in a database, sorry, Bluebeard, no call. ■

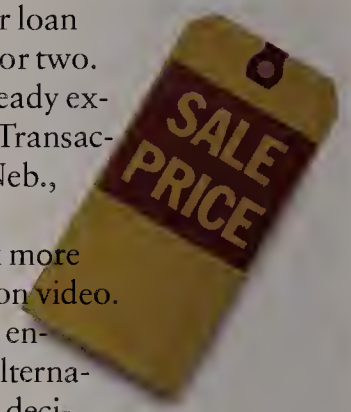


Worth the Wait

NEW TECHNOLOGY You're waiting, again. Stuck tapping your foot while the bozo in line ahead of you figures out how to use the automated teller machine. Like they aren't all the same: card, code, cash, receipt, done. But, nooo. Lightning Boy can't seem to master the keypad in less-than-marathon time. Imagine how flummoxed he'd be if he had more choices.

Well, it won't be long before Lightning Boy will have a platter of options such as theater tickets, postage stamps, promotional coupons and more. Anything an ordinary PC can send to a printer can be delivered into your hands at an ATM.

That same ATM will also be able to take your loan application and give you a decision in a minute or two. The technology required to accomplish that already exists, says Jon Howe, chief technology officer at Transaction Systems Architects Inc. (TSA) in Omaha, Neb., marketer of ATM products.



The ATM of the future, Howe says, will look more like a kiosk—with color graphics and full-motion video. Some will be equipped with videoconferencing, enabling people to research investments, discuss alternatives with a broker at the bank, then implement decisions by making choices on the kiosk screen.

How soon will all those features become available? You'll have to wait for the banks. "Banks are fairly conservative," says Diane Piccolo, ATM product manager at Omaha-based Applied Communications Inc., a TSA subsidiary. "They have to be very confident in the software and its security before these things become a reality."

Best of all, the future will also bring your own personal ATM. This technology uses a microchip-embedded plastic "smart" card that stores cash value and subtracts from it when you use the card for a transaction. You'll be able to insert the card into a reader attached to your PC and then download money from your bank—no waiting, and no Lightning Boy.

–Miryam Williamson

Wanted: Paperless Hiring Process

RECRUITING How much time have you wasted slogging through piles of resumes sent by lackluster candidates? Worse, how many times have resumes from stellar candidates collected dust on an HR rep's desk because no one had time to give them a look-see? Dealing with the hiring paper shuffle is no easy task, especially at large corporations.

But Marriott International Inc. has found a way to avoid being beaten by the pulp and make the application process speedier for candidates as well. With one phone call, job-seekers can apply for hundreds of Marriott jobs through the company's career hotline (888 4-MARRIOTT). Built with Employers Resource Corp.'s (ERC's) Selectech Instant Interview telephone- and computer-based prescreening system, the hotline eliminates the paperwork and delays inherent in the traditional hiring process. Marriott expects the system to help fill more than 50,000 job openings each year in 11 cities throughout the nation and to reduce back-office expenses of a large HR department by 50 to 70 percent.

During its first month of operation, the hotline received more than 20,000 calls, says Richard Bell-Irving, vice president of human resources for Marriott

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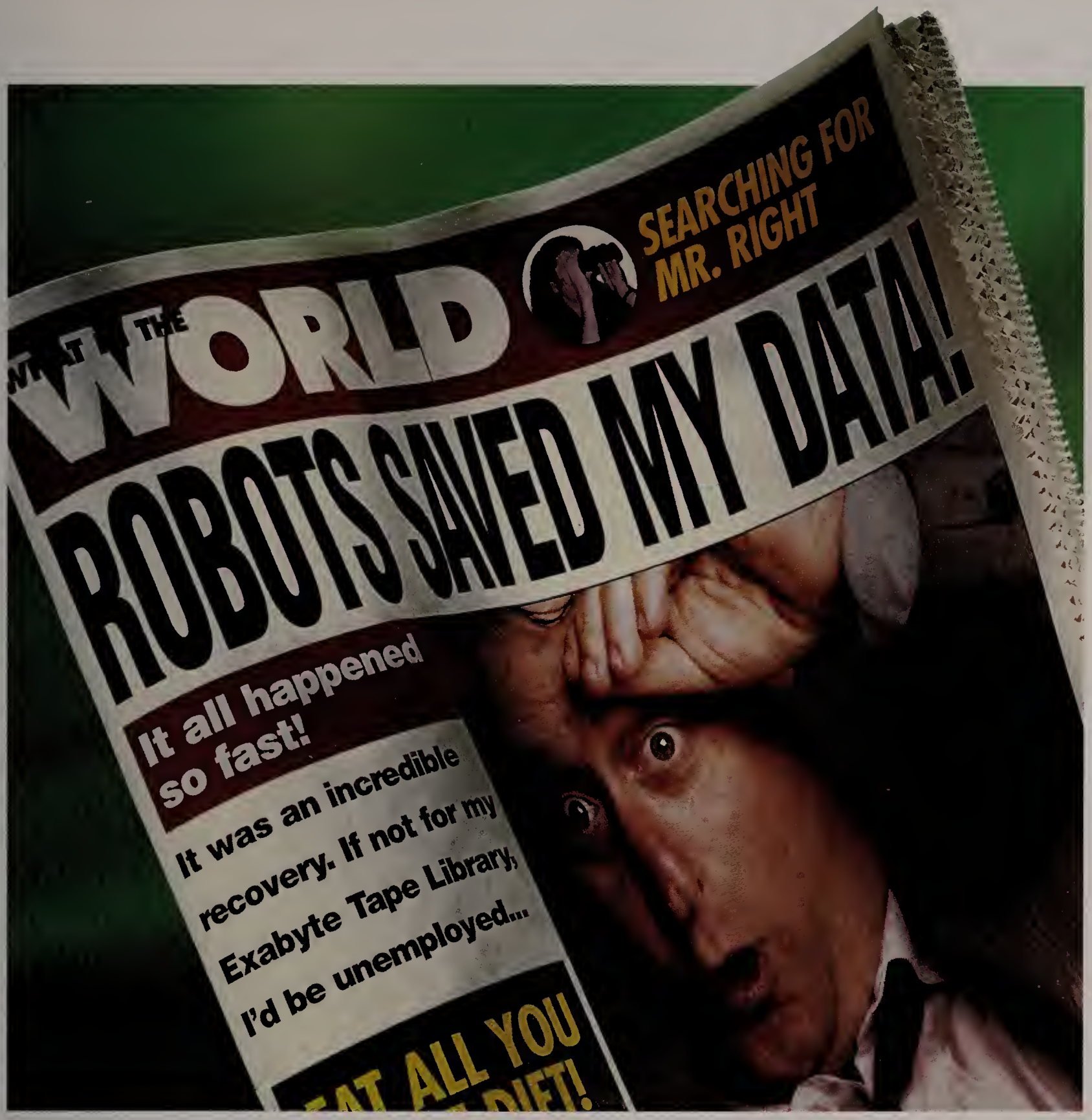
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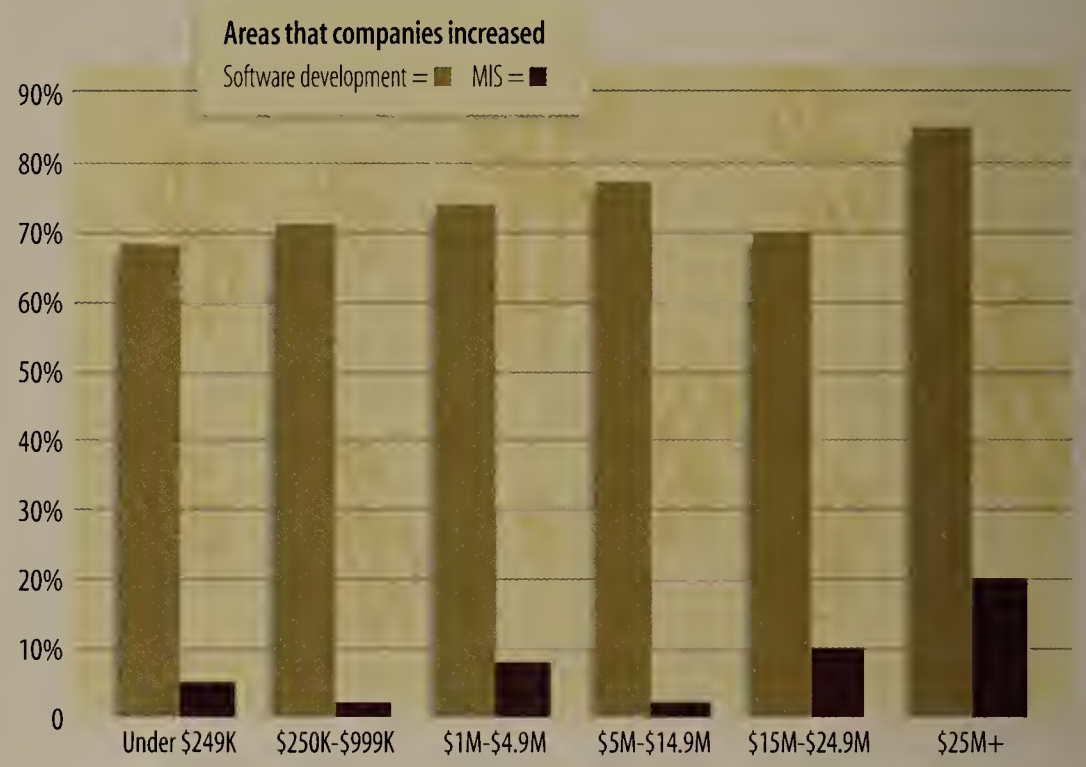
Trendlines

At their peak in 1977, U.S. companies' foreign operations accounted for about 3 percent of the world economic output outside the United States. By 1993, U.S. companies' share of non-U.S. output had dropped to around 2 percent.

–From "International Production in World Output," a National Bureau of Economic Research paper by Eric Ramstetter, Robert Lipsey and Magnus Blomström

Growing Crazy

In 1995, 69 percent of software companies Coopers & Lybrand LLP surveyed increased the aggregate size of their workforce. Topping the category of growth areas was software development, which saw an average increase of 74 percent across corporations of differing revenue size. MIS departments were at the low end of the scale, with an average increase of 7.8 percent.



SOURCE: COOPERS & LYBRAND L.L.P.'S "NINTH ANNUAL SURVEY OF COMPENSATION IN THE SOFTWARE INDUSTRY"

Lodging. "Before [the hotline], we had no nationwide way of saying that we had opportunities within Marriott," Bell-Irving says. "With Selectech, we have a uniform process callers can go through to make sure they meet basic requirements."

"The feedback [from candidates] has been extremely positive," adds Peter I. Clarke, vice president and CIO of Norwalk, Conn.-based ERC. From start to finish, the screening process takes just five minutes. A voice guides callers through a series of questions to elicit information such as preferred city and salary requirements. At the end of the call, callers are immediately told if they're qualified for the position available. If they are, they can schedule an interview through Selectech's automated scheduling system.

According to Clarke, the impersonal nature of the automated screening system is a benefit rather than a drawback. It eliminates concerns about discrimination and favoritism because questions are phrased the same way each time. Plus, he says, "applicants seem to be more honest with a computer than they are with a human being because they know the machine isn't judging them."

Selectech is especially well-suited to the hotel industry where the turnover rate is traditionally very high, says Clarke. Say Marriott discovers a trend that cleaning people with less than a year of hotel experience tend to quit after six months. Marriott can then program Selectech to ask questions based on that issue to predict the likelihood of the employees quitting shortly after they are hired. Most important, Selectech will help Marriott trim the bottom line by reducing HR costs associated with interviewing job candidates.

Other Selectech customers include Sheraton International Hotel and May Department Stores Co. A sample Selectech job application is available by calling 800 700-5841; for more information about ERC, call 203 846-4455.

–Jennifer Bresnahan

"God created the world in six days. But he didn't have an installed base."

–Don Tapscott

Author of *The Digital Economy: Promise and Peril in the Age of Networked Intelligence* (McGraw-Hill, 1996)

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Source: Qualitative Cost/Value Analysis of Client/Server Messaging, Creative Networks Inc. 5/23/96

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Source: Microsoft Website and Lotus Website 8/12/96

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The Stuff Dream Jobs Are Made Of

Retaining IS staff requires more than just attractive pay and a few pats on the back

A SENIOR VICE PRESIDENT at Microsoft Corp. once was asked why he liked his job and why he stayed with the company. His reply included the lingo one might expect—*super* challenging, *super* exciting, *super* etc., but also this coda: "I get all the free soda and juice I can drink."

While he obviously derives job satisfaction from something other than the company's generosity at the beverage tap, the VP's last remark is more than a nice punch line. Free soda is not just a frill. At his company, it's a tangible sign of the decision (for either shrewd or soft-hearted reasons) that morale matters more than the piddly sum spent on Pepsi for the masses. And if employees think their company values morale, the assumption that it also values their happiness and diligence easily follows. Free soda is likely to come with other, more substantial amenities such as training, recognition and generously sized cubicles. Those kinds of good vibes can enhance significantly employees' sense that the commute leads to a place they don't mind being every day.

That is particularly true of IS employees. Salary accounts for only 20 percent of the factors that contribute to their work satisfaction, according to Gene Raphaelian, an analyst at Gartner Group Inc. The remaining 80 percent comes from stuff that doesn't have a watermark or serial number—like training, recognition, flexible benefits, flexible schedules and more-than-adequate work environments. That isn't necessarily good news for CIOs who still think securing market-value pay for an object-oriented programmer is a human resources coup. Clearly, CIOs need something other than greenbacks to wedge against the revolving door in the IS department.

These days, downsizing and reengineering have made company loyalty a bad joke. For IS shops, employee skepticism is exacerbated by rapid advances in technology. Not only does that create fear of obsolescence in employees, but it also leads to a perpetual (and expensive) need for CIOs to train and hire. As a result, IS workers turn into trend-chasing job-hoppers, and companies sink money into retraining employees who then split for better pay.

But it doesn't have to be that way. Sometimes companies come up with the "frills" that dress up a high-paying job enough to make it irresistible. One company that has had significant success holding on to its people using nonmonetary lures is Cleveland-based Progressive Insurance Co.

ILLUSTRATIONS BY DAVE CUTLER; CORNER IMAGE BY CARL TREMBLAY

You Like Me! You Really Like Me!

So what does Progressive do that's so...well, progressive? For starters, people in IS understand how their code relates to stuff the business side does to make money. Progressive's senior level development managers are divided among the company's business processes, and they supervise multiple projects related to those functions. Progressive also has a gain-sharing plan that gives IS employees returns based on how well the business does and how much IS con-

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tributed to that success. The strings dangling from the paychecks tell employees they are valued and respected for their ability to "get" the business itself. "You're not just a programmer anymore. You're trying to program things that really take care of customer problems," says CIO Allan Ditchfield. "We've linked everybody in heart, mind and pocketbook."

The many amenities on Progressive's two-year-old campus are also a sign to employees that the company appreciates when they show up. The spread includes an exercise facility, health clinic, gift shop, post office, dry cleaner and running trails. The idea behind the $75 million facility is to make employees' lives easier while encouraging physical and mental health, says Jim Gordon, a human resources manager assigned to the claims division. Of course, part of the company's strategy is to boost productivity by cutting out the need to hit the mall at lunchtime. But the resulting convenience for employees, who can even get flu vaccinations at work, might make them think twice before snapping up other job offers. Progressive has even contracted with masseuses for 20-minute neck and shoulder treatments on Fridays, a perk that hasn't exactly been a hard sell, Ditchfield says.

Whaddya Think?

While many companies pay lip service to "open" environments in which employee input matters, in practice their cultures often encourage people to check dissenting opinions at the conference room door: Tell me what you think, as long as it's what I want to hear. Progressive genuinely takes a crack at eliciting a measure of honesty from its employees. The company uses Lotus Notes, and every major proposal about procedural changes or new projects gets run up the groupware flag pole. Managers also place their project reports in Notes databases, so everyone can read assessments about what's holding up progress and what's needed to meet crucial deadlines.

In addition, twice a month Ditchfield rounds up the troops for what he calls "Doughnuts with Ditch," where he invites 10 people randomly selected from the 700-member IS staff to hang out in his office, scarf pastries and talk shop. "We talk about what they'd like to see changed or firmed up," Ditchfield says. "Sometimes we actually do something right as a management team, believe it or not, but we may never know that if people don't come back and say, 'Hey, this is a good thing.'"

In part, these strategies work because management has proven that it doesn't live in fear of criticism and can even (occasionally) laugh at its own foibles. Progressive celebrates Halloween as a company holiday, so employees take a half-day to dress in costumes, eat and party. At one such celebration, the IS staff performed a skit based on *The Wizard of Oz* in which they compared management's simplistic attitude toward object-oriented programming to Dorothy's trust in her red shoes—if I just click my heels three times, this project will be home-free. "It was sort of poking fun at management about how they think about new technology and think it will happen overnight," Gordon says sheepishly.

The company seems capable of acknowledging the subtle truth behind such a send-up. When it can, the company responds resoundingly to input. A few years ago, a woman at Progressive

Hire Power

Knowing when to let go may be more critical than holding on

BEFORE YOU SCURRY off to draft a new retention plan for your company, consider that keeping people might be less important than following a smart hiring strategy. Assuming those you have on board are the best for a given project or that every project requires full-time in-house employees is a mistake, says Philip Anderson, associate professor of business administration at Dartmouth College's Amos Tuck School of Business Administration.

"Retention is not the problem. It's a symptom of some other problem," Anderson says. "The first thing you have to do is seriously analyze: What should I make and what should I buy? What is it that our full-time, continuously challenged professionals should be doing, and what should we outsource?"

Progressive Insurance Co. found those answers the hard way a few years ago when it hired object-oriented programmers for specific projects. After the initial development push subsided, many of those recruits left for pastures with more green of the paper variety. "If I had it to do over again, I would be more cautious about hiring," says Jim Gordon, a human resources manager assigned to Progressive's claims division. "I would have outsourced more on the front end to allow our legacy people to have a little more time to learn the skills. It cost us a lot of cash to bring in people with those skill sets, only to lose them."

Other advice for CIOs from Anderson and Gordon:

- Hire former consultants who are "vaccinated" against the lure of big money and a fast life.
- Once people acquire "hot skills," consider tying additional bonus pay to the length of service so that they have an incentive to stay.
- Avoid hiring IS employees whose resumes look like AAA maps. Nomads who chase technology are unlikely to develop loyalty to your shop.
- Consider encouraging employees who want to leave to set up their own businesses so that as a primary client you benefit from their skills without paying their health and retirement costs.

–Cheryl Dahle

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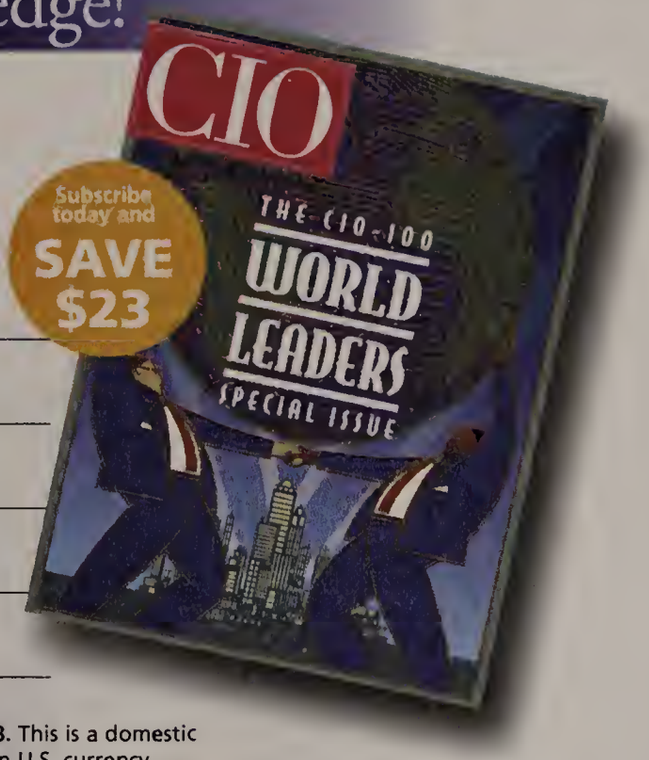

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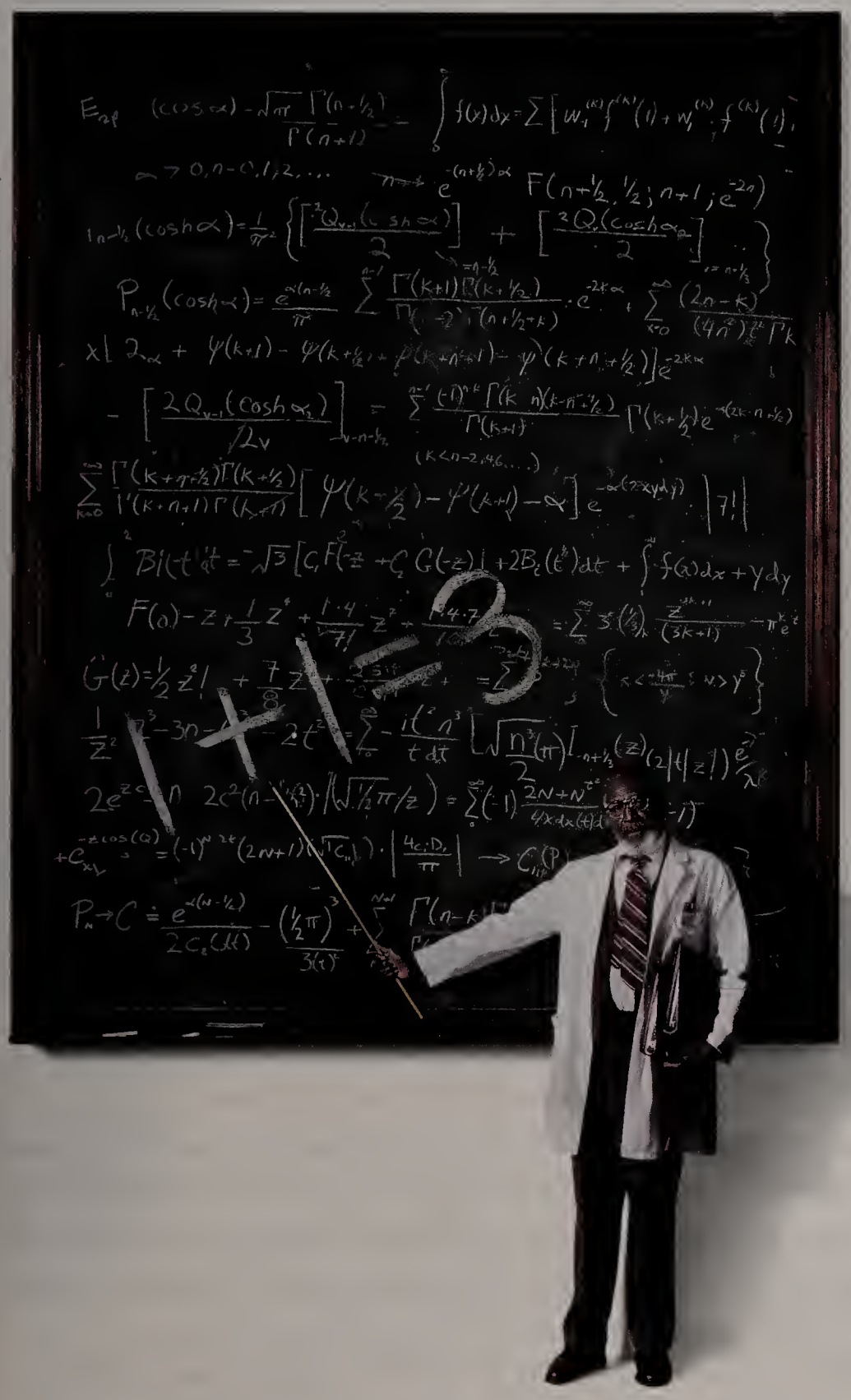

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wrote a letter to the CEO pointing out that the company's business dress code forced her to spend more cash than her male co-workers, who had only to buy a few ties and a white shirt. So the CEO made every day casual day. Just how casual? One programmer reports that a few weeks after the policy took effect, his neighbor stopped him in his driveway and told him she was sorry he had lost his job. "You may think a dress-down code is insignificant," says Kim Price, an IS senior manager at Progressive. "But it's an approach that costs us nothing, and it buys back a lot in morale."

COSTLY MOVES

Turning over a skilled IS programmer who makes **$60,000** per year may cost as much as **$7,500** that year in lost productivity.

SOURCE: GARTNER GROUP INC.

Well-Trained

Another no-brainer on the morale front is a good training program. According to Gartner's Raphaelian, the turnover rate in IS shops that offer fewer than five days of training per person is more than twice that of companies that offer more extensive programs. At Progressive, the IS shop often retrains legacy programmers on new technologies. They also move people around on projects to minimize the "haves and have-nots" effect created by adopting hot technologies.

More careful testing at the front end gives Progressive a clearer idea of who needs their skills polished. When they're hired, all employees are tested to assess their skills. Based on the results, they are placed in a variety of training programs, including LAN-based independent tutorials and group sessions with outside experts. Progressive spends about $2,000 on training per year per staff member and $8,400 annually for each new hire, Gordon says. (Incidentally, skills are also tested when staff members are up for promotion.)

The fact that IS folks can transfer easily between projects puts pressure on managers to actually manage. To keep the focus off paper shuffling and deadline fascism, Progressive invests in training for managers as well. Several years ago, the company sent its managers to an off-site training session to discuss a kinder, gentler, people-friendlier approach. New managers are trained as they join the company.

Price says the training has contributed to an expectation that managers will chew the fat with employees throughout the year about career- and job-related issues outside the formal review process. But the onus is on both sides to get the conversation started. "It's just part of the day-to-day discussion," Price says. "We expect people to take responsibility for their careers, so we expect them to approach their managers to tell us what things are interesting and challenging to them. At the same time, we are responsible for providing the projects and assignments that will get people moving in that direction."

While Progressive talks up its emphasis on respect and good treatment, Price doesn't mean to imply that the company sacrifices the business goals at the altar of the touchy-feely gods. Making decisions in situations where the business's interests are at odds with those of the employees is never easy. "We can't sacrifice speed and efficiency," Price says. "Sometimes we do have to give people assignments that they're not happy about."

That's only realistic. What is refreshing about Progressive is its recognition that for too long the business has creamed employees in the arm wrestling match of interests, when both sides could've been winners if they had shaken hands instead. "When I came here five years ago, the reputation was that it was a Cobol shop, and basically all we did was bring people in and put them on projects and burn them out," Gordon says. "Since then, we've created a culture that says, 'Let's ease up on that and make this a place a lot more environmentally friendly for people." CIO

Associate Editor Cheryl Dahle can be reached at cdahle@cio.com.

Crowd Pleasers

Customized incentives can rev up your staff

OK. SO YOU KEPT 'EM. Now how do you *motivate* those employees you snatched from the revolving door?

According to a recent study on what makes employees feel like doing more than holding down a chair all day, the key to greater productivity and job satisfaction is understanding how different incentives motivate different people, then developing rewards tailored to individual desires. Three years of data was collected from 267 information systems professionals by James C. Wetherbe, director of the FedEx Center for Cycle Time Research at the University of Memphis, Mark N. Frolick, the center's associate director, and Bond Wetherbe, director of the Center of Development at the University of Houston.

IS developers, according to the study, were most motivated by "being assigned to projects that have high visibility." IS managers and marketers, however, were most motivated by "self-satisfying work." Both marketers and developers gave a big thumbs down to routine and repetitive tasks.

One disturbing trend the study found was that managers often assume mistakenly that their employees are motivated by the same things that motivate them. Instead of expecting employees to be lower-paid versions of themselves, managers would do well to "mass customize" incentives based on who in their organization responds to factors such as achievement, recognition, advancement and responsibility.

For more information, contact James C. Wetherbe at 612 624-0547.

–Tom Wailgum

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Joining the Culture Club

If you want to understand employees' behavior, go to the experts

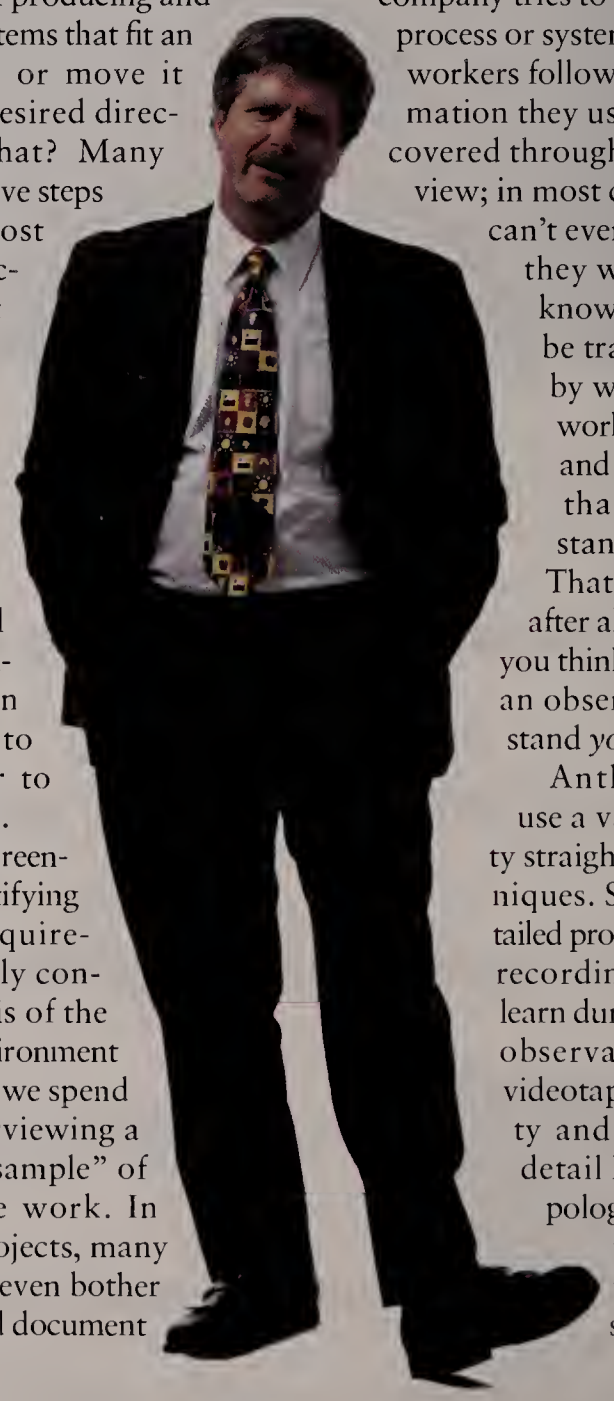
HERE'S AN IDEA THAT MAY not have crossed your mind: The next time you hire a systems analyst, look for someone with a degree in anthropology. Or the next time you place an ad for a programmer, after "knowledge of C++ required" put "some ethnographic experience desirable." OK, stop chuckling. Believe it or not, many smart companies will hire anthropologists in the future, and corporate anthropologists are already in demand.

Anthropology, for those of you who spent your college careers in the underground computer vault, is the study of cultures. Any culture—not just those on South Sea islands—is a respectable topic for anthropological analysis. Ethnography is one of the primary methods used by anthropologists to understand cultures; it involves living in a culture, observing it carefully and describing those observations in minute detail. Clifford Geertz, one of the of the world's most respected anthropologists (and still not exactly a household name), called that method "thick description."

What business do these people have in the hallowed halls of IS? Just ask yourself (or even better, ask your customers) if your systems developers have a record of producing systems that fit the culture of the user organization. Think about whether the designers of new business processes in your organization—be they external consultants, internal reengineers or systems analysts—have been sensitive to how work really gets done and what motivates employees to work harder and more efficiently. Think about how well IS has been able to understand and meet the information requirements of your company's senior managers. Do you know why some managers like computers and why some hate them?

Let's be honest. Most IS groups do an abysmal job of producing and implementing systems that fit an existing culture or move it gracefully in a desired direction. Why is that? Many methodologies have steps that sound almost ethnographic, recommending that analysts actually observe how work gets done in an office or factory before building a system to support it. But such careful observation is usually abandoned in the mad rush to start coding (or to install a package).

Whether we're reengineering or identifying information requirements, we usually consider our analysis of the existing work environment to be thorough if we spend a half-hour interviewing a "representative sample" of those doing the work. In reengineering projects, many companies don't even bother to understand and document the current business process because they plan to obliterate it. Variations in how tasks are performed between workers and locations are written off as products of ignorance or poor management. In most cases, managers haven't a clue how those with jobs slated for automation get meaning from their work, respond to their work environments and use or ignore information on a day-to-day basis.



So how can corporate anthropologists help? The basic idea is that current work practices are worthy of respect. People do things the way they do for specific reasons, and those reasons should be considered when a company tries to move to a new process or system. The process workers follow and the information they use can't be discovered through a brief interview; in most cases, workers can't even explain how they work. It's tacit knowledge that can be transferred only by watching them, working with them and demonstrating that you understand their world. That takes a while; after all, how long do you think it would take an observer to understand *your* job?

Anthropologists use a variety of pretty straightforward techniques. Some keep detailed project notebooks, recording what they learn during a period of observation. Others videotape work activity and analyze it in detail later. Anthropologists get out into the field—if they want to study the logis-

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tics process, they don't follow around the vice president of logistics; they ride in delivery trucks. Anthropologists do not simply observe; they try to ascertain whether a particular change or system would fit into the work environment.

One high-tech manufacturer, for example, used ethnographic analysis to determine whether artificial intelligence tools would help customer service representatives solve specific repair problems over the telephone to avoid dispatching a service technician to the customer site. The answer? A qualified yes; some of the representatives were quite capable of remote problem solving, but many were unwilling or unable to go so far beyond their job descriptions.

Think it's too time-consuming or too expensive to employ anthropological methods? How much does it cost to build a system that is never used? How expensive is it to "finish" a system and then have to modify it to do what your customers really want? How much does a consultant charge to design a new process that is never implemented? As the Japanese have been saying for years, spending more money early in the development of new systems and processes means spending less later to fix them.

This is not a topic sequestered in the ivory tower. Hundreds of anthropologists are working on these types of issues. Motorola Inc., for example, teaches anthropological analysis at its Motorola University; the anthropologists are credited with pointing out that teenagers were using pagers as fashion accessories, not as utilitarian devices. Motorola then radically expanded the range of colors available for its pager line.

At Nynex and Hoffman-LaRoche Inc., anthropologists have helped reengineer business processes in a manner tailored more to actual work behaviors than most other projects of that ilk. At Hoffman, anthropologists also studied how scientists were using an expert system that described the drug development process.

One of the most influential incubators for corporate anthropologists is the Institute for Research on Learning in Menlo Park, Calif. A small consulting and research organization with many Xerox Palo Alto Research Center connections, IRL has a cadre of ethnographically oriented researchers who study learning activities in schools and workplaces. IRL experts have worked at Xerox Corp., National Semiconductor Corp., Sun Microsystems Inc. and many other companies around the world. They are pioneering a participatory form of consulting that could spread to mainstream companies. Most large consultancies already have change management practices, but they generally use traditional approaches to understanding how an organization works, such as brief interviews or surveys.

Of course, life with anthropologists can have its problems. One I have noted is that they want to observe for too long before coming to a conclusion. Insisting that you have to observe workers for six months before understanding what they do is just as untenable as presuming you can figure it all out in 15 minutes. And anthropologists are often reluctant to generalize from their observations in a workplace; sure, every work situation is unique, but it's also possible to concentrate on common facets.

Anthropologists just out of the university may also be naive about other realities of corporate life, such as the need for high-level sponsorship and the fact that lifetime employment is no longer a corporate guarantee. But they can learn quickly in their new surroundings.

Just in case you're wondering, I have no ax to grind. I was trained as a sociologist, not an anthropologist. Sociologists often make the same mistakes corporate analysts do: thinking about people only in the aggregate and trying to understand what makes them tick by gazing at a computer screen. Not just any ol' social scientist will do; you should look for the real anthro thing. They may be called social anthropologists, cultural anthropologists, even industrial anthropologists. Look out for physical anthropologists, however; they mostly dig for bones.

Whatever type of anthropologist you're searching for, you'd better move quickly. Universities don't turn out a whole heap of anthropologists each year, and post-graduate training in the field isn't widely available at the local junior college. A fast-moving company—maybe yours—will be able to corner the corporate anthropologist market pretty quickly, and it will have the most cultured systems of all. CIO

Principles of Corporate Anthropology

- **Cast a wide net.** You don't know in advance what aspect of a culture will be most important to your objective, so try to observe everything.
- **Take some time to observe** the people and processes in which you are interested. True understanding comes with living and working alongside your research subjects.
- **It's hard to listen and watch if you're talking.** You may feel that you know the solution to the problems of those you're observing, but it will be better if they figure it out with little help from you.
- **Be wary of generalizations.** Sure, this office may perform the same function as several others in distant parts of the company. But they may see and do things differently; visit them too if you can.
- **Pay more attention to what people do** than what they say they do. We all want to be viewed as rational, thorough and well-informed decision-makers. Unfortunately, many of us aren't.

Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at Tdav@notes.bus.utexas.edu.

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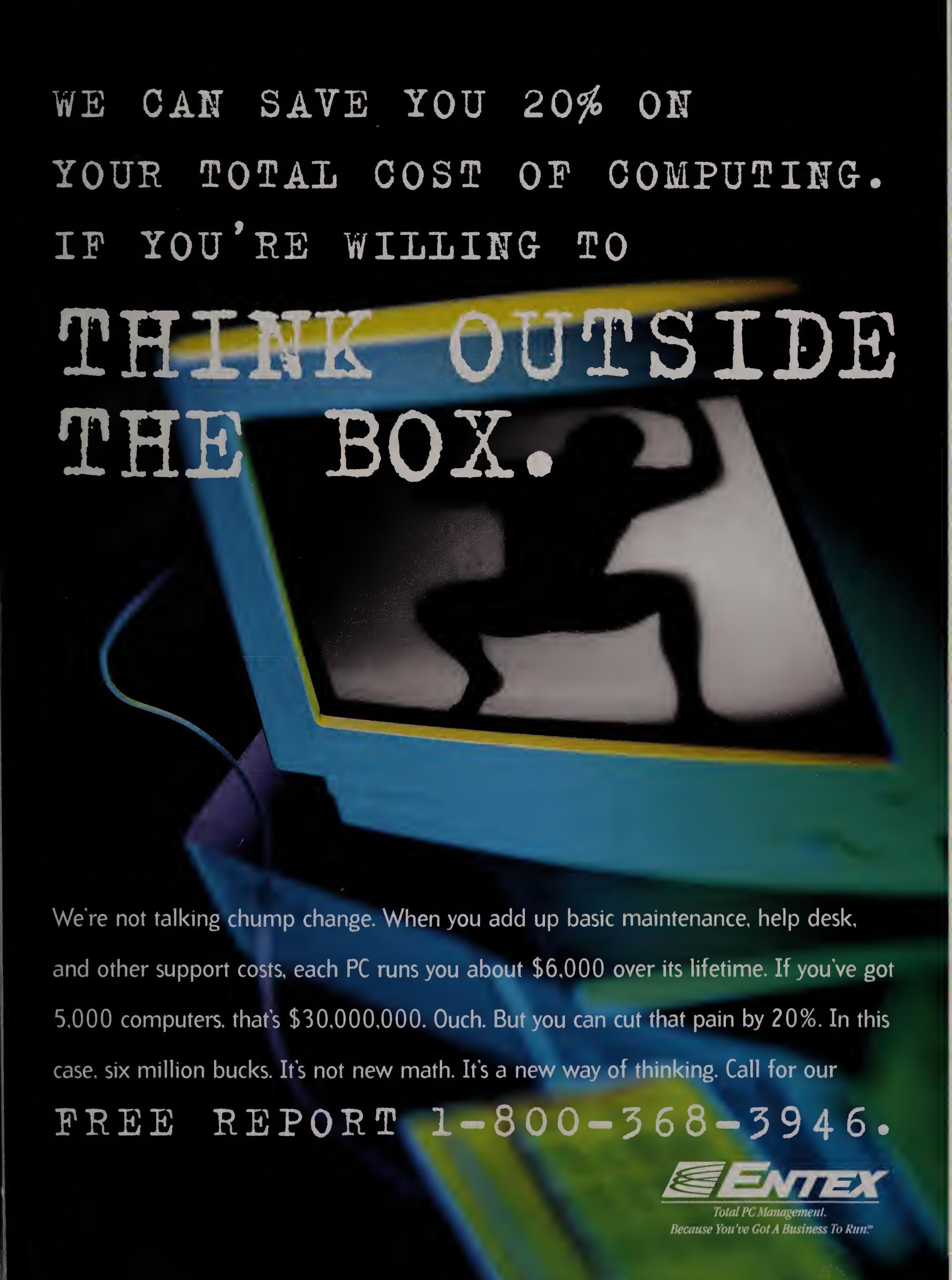

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Mission POSSIBLE

The exponential rate of change in technology makes keeping up seem unachievable. But some companies have developed strategies to stay ahead of the curve.

BY JENNIFER BRESNAHAN

ASK A TYPICAL CIO HOW HE KEEPS UP TO DATE with new technologies and he'll likely quip, "Not very well." Today, new players and products crop up faster than end-user complaints. Before it gave up counting last year because of sheer volume, Ernst & Young LLP's Center for Technology Enablement was tracking 2,000 new software, hardware and information-related products per month. (And this massive chunk still represented only a quarter of all technology-related products.) Keeping an eye on new technology developments proves impossible—blink and you're obsolete. But CIOs, charged

Reader ROI

KEEPING UP WITH NEW technology is one of the most important—and difficult—responsibilities of an IS executive. CIOs need to be aware of new products as well as understand how to apply them. This article examines:

- Effective strategies for dealing with technology overload
- CIO member organizations and research services
- The CIO's role as technology guru

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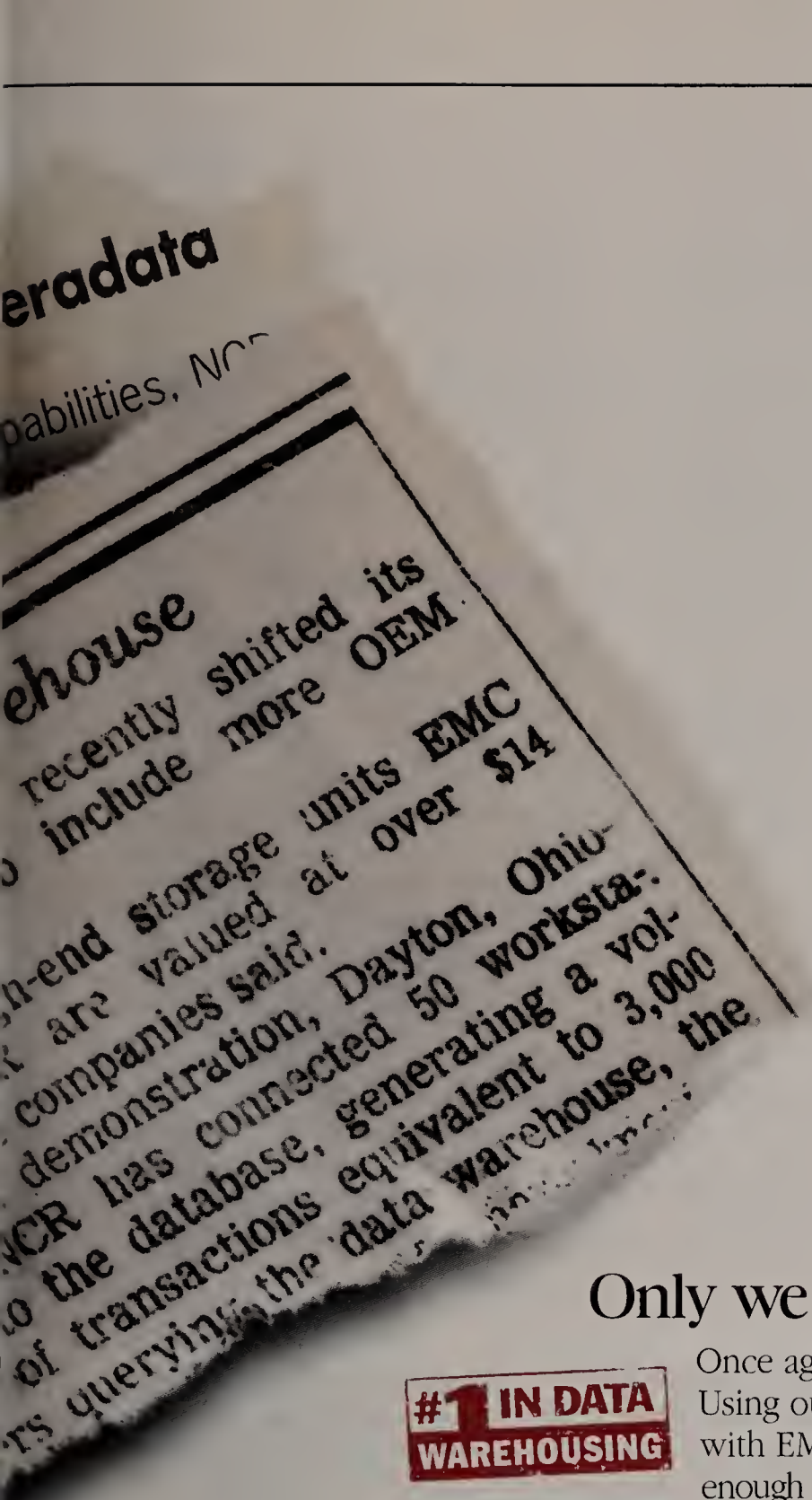

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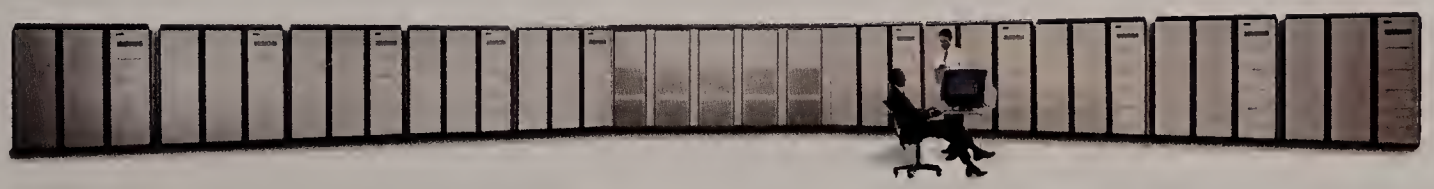

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with finding the right technology at the right time to advance their organizations' strategic business goals, must be ever-vigilant in their watch for new trends and applications. The profitability and competitiveness of their companies depend upon it. And CIOs who value their jobs must also be prepared to discuss the supposed miracle technologies their bosses discover in airline magazines.

Jon Bridges, senior director of information technology at Chick-fil-A Inc., an Atlanta-based, $5 million fast-food chain, jokes that there's more press hysteria about the Internet alone than there was about the O.J. Simpson trial. "Everyone is coming to you at lunch and asking your opinion about technology," he says "It's important to have your thoughts in order and have a strategy that you can articulate with confidence."

For the past three years, respondents to *CIO*'s private reader poll consistently have rated keeping up with the latest in technology as the most difficult aspect of their job. *CIO*'s editorial advisers devote as much as 30 percent of their time to this pursuit. Bridges keeps a seven-inch stack of periodicals by his bedside and grabs a read when he gets the chance. Unisys Corp.'s CIO, Dewaine L. Osman, goes home from work each night, pours himself a Coca-Cola and surfs the Web for several hours. And that's only the beginning. Most CIOs have had to build up an arsenal of information resources to compensate for the absence of one definitive source. "I have five different ways to keep up on technology," says Frank Caccamo, vice president of management systems for The Procter & Gamble Co. in Cincinnati and a *CIO* editorial adviser. "Unless you accept what I describe as a way, there isn't just one way to do it. You can't do just one thing."

When Michael Earl, a *CIO* editorial adviser and professor of information management at the London Business School, conducted a survey of Britain's leading-edge CIOs four years ago, he was surprised to learn that there were no best practices in this area. Few companies were actively engaged in scanning, evaluating, developing or experimenting with new information technologies. Instead, their efforts were limited to attending exhibitions and vendor events, reading magazines and subscribing to technology-watching services. This year, Earl sent out the survey again and found "more interest in the area this time around but still no breakthrough" in how to keep up, he says.

KNOW YOUR PRIORITIES

YET SOME I.T. SHOPS are muddling through better than others. Keeping up means much more than just knowing about new products as they emerge; it includes understanding how and when to apply them. And it means making educated guesses about hot trends and technologies that haven't even been developed—a tall order for a lone CIO. Success hinges upon the CIO's ability to come up with a coherent strategy for slicing up the market and narrowing the focus. Claude Marais, director of processing services and planning in information services for Philadelphia-based Elf Atochem North America, approaches the problem by sorting through tech-

CIO MEMBER ORGANIZATIONS

GEARED TOWARD senior-level IT executives, member organizations offer CIOs a valuable chance to network with peers. CIOs can hear the latest buzz—what works, what's a dud and how to win user support or resist user demand for a particular technology. These organizations are especially helpful in illuminating trends in applied technology instead of just describing new products and vendors.

Chick-fil-A's senior director of information technology, Jon Bridges, relies upon his contacts at SIM, Omicron and the MIS group of the National Restaurant Association to keep up with competitors McDonald's and Wendy's. The first thing he does when an important decision comes down is call a member who's already been through a similar experience. "There's nowhere else I can go to ask stupid questions," he says. "The whole key is how fast can you get stuff put out. If you spend all your time researching, you get bogged down pretty quickly."

Yet CIO member organizations have their drawbacks. The infrequency of meetings is limiting. In addition, the value of CIO member organizations mainly lies in sharing best practices—helpful for smaller, newer companies but less so for companies that already operate efficiently, says John Parkinson, director of Ernst & Young's Emerging Technologies Research Practice. "People who are good and regular generators of best practices are getting tired of sharing them with those who aren't," Parkinson explains.

Chicago Research & Planning Group
Barrington, Ill. 312 609-6500
Membership: 175 senior-level IT executives
Cost: $800-$2,500
Lowdown: Good, medium-size member organization; in addition to the usual networking opportunities, CIOs can participate in pilot projects, special interest groups and technology labs.

College of Healthcare Information Management Executives (CHIME)
Ann Arbor, Mich. 313 665-0000
Membership: 580 CIOs in health-care field
Cost: $270-$320
Lowdown: Best place for CIOs in health care to learn about emerging information technologies in their industry.

Information Management Forum (IMF)
Atlanta 770 455-0070
timf@mindspring.com
Membership: More than 100 corporate members, comprising more than 3,000 vice-president-level participants
Cost: N/A

"I'd rather let our competitors experience the pain and I'll benefit from it."

–Ray Wiles

nologies based on his company's priorities. For technologies that Marais sees as offering an opportunity to significantly affect the bottom line or become more competitive, he strives to be an industry leader. For technologies that are important but not transforming, Marais is interested only in keeping up with the pack. And of course, anything he judges to be flash-in-the-pan technology he'd rather not touch. Each category warrants a different tactic. In the areas where Elf Atochem takes a leadership role, Marais actively fosters environments suitable for learning. To explore the procurement of information technology and services, for example, Marais created a procurement working group through the Society for Information Management (SIM) and initiated a research relationship with Syracuse University. He also runs a SIM forum in Europe every year on the topic. Where Elf Atochem merely wants to follow, Marais reads widely, networks with peers and colleagues, and subscribes to research and scanning services.

LOOK TOWARD THE FUTURE

MANY COMPANIES MAKE the mistake of restricting their focus to existing technologies that address current business needs; E&Y calls these "horizon one" technologies. Organizations like Chrysler Corp. go beyond horizon one by envisioning future scenarios and technologies—horizons two and three—in E&Y's collaborative research groups. Composed of companies and E&Y analysts, the groups use scenario-based planning to monitor horizon two products, which are those predicted to appear in two to three years (see "Into the Futures," *CIO*, Dec. 15, 1995/Jan. 1, 1996). Participants come up with five or six reasonable probability models of what a given technology will look like in three years, then design watch points to see whether the technologies that would make these scenarios possible actually are being developed. More outrageous scenarios and relationships with R&D labs are used to track horizon three technologies, expected to arrive in three to five years, such as biological computing models and self-organizing systems.

LEARN TO DELEGATE

ANOTHER WAY CIOs CAN get a handle on emerging technologies is to concentrate on a few key areas and delegate the rest. Just how this shakes out varies widely from company to company. At Unisys Corp. in Blue Bell, Pa., Osman focuses solely on the $6.5 billion hardware vendor and systems integrator's business strategy and internal architecture, while the chief technology officer deals with the products Unisys sells to its customers (at press

Lowdown: More concerned with management issues than technology; focused on CIOs but also appeals to next level down.

National Association of State Information Resource Executives (NASIRE)

Lexington, Ky. 606 231-1905
nasire@iglou.com
Membership: 828 individual members; 125 corporate members
Cost: Free for state-level CIOs; $2,000 for corporate membership; $500 for nonprofits
Lowdown: Great place for state-level CIOs to network with their peers through conferences and online discussions.

Omicron

Mountain Lakes, N.J. 201 335-0240
jwebber@omicronet.com
Membership: 110 member companies (Fortune 300 companies), comprising 50,000 IS and business professionals
Cost: New members, $12,500; renewals, $9,500
Lowdown: Omicron touts its offerings for senior-level IS executives, but it may in fact be more appropriate for the next level down. Omicron operates independently from vendors but sponsors vendor forums as well as a member hotline, electronic interchanges and roundtable discussions.

Open User Recommended Solution (OURS)

New York 212 938-5534
ours@pipeline.com
Membership: 270 members from 50 organizations, comprising vendors, service providers and Fortune 500 users
Cost: $5,000 for users; $20,000-$30,000 for vendors (by organization only)
Lowdown: Depending on how you feel about vendor involvement, OURS may or may not be for you; requires more activity than most organizations.

The Research Board

New York 212 486-9240
www.researchboard.com
Membership: 90 top-level IS executives
Cost: N/A
Lowdown: If you can manage to finagle a membership from this highly exclusive society, you'll be in very good company. Everybody who belongs raves about this organization, but membership is open only to executives from companies with at least $5 billion in revenues; executives from companies in the high-tech or communications industry are barred. (The Research Board also runs an associate board for slightly smaller companies.) Meetings are highly confidential and vendor influence is prohibited.

Society for Information Management (SIM)

Chicago 312 644-6610
www.simnet.org
Membership: 27,000
Cost: $250 per member; $3,500 for an enterprise
Lowdown: One of the biggest and most popular member organizations for senior-level IS executives. SIM is focused more on management issues than technology, but it does have an annual executive technology summit and working groups that study specific IT issues. There's little vendor involvement or input, which could be considered either good or bad. SIMnet is a great electronic networking tool.

–J. Bresnahan

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time, Unisys' CTO, Ronald K. Bell, had left and had not been replaced). Each makes decisions about new technologies with and for his department independently of the other. And each in turn relies upon his staff to conduct research on its own. When the CTO's and CIO's departments disagree on something that affects the whole enterprise, as happened recently when one group wanted Microsoft Corp.'s mail system and the other preferred Lotus Notes, Osman listens to representatives from both departments, tests the products in the company's in-house lab and calls vendors to ask why Unisys should chose one product over the other.

LEAVE EXPERIMENTATION TO COMPETITORS

RAY WILES, CIO AT TransAmerica Real Estate Information Companies in Dallas, lets other companies muck around with new technologies while he watches safely from the sidelines. Wiles' IS department consists of several teams dedicated to exploring specific technology areas such as legacy systems, architecture and network services. A future technologies director acts as liaison and sounding board for the teams, bringing Wiles into the discussion when appropriate. If they all agree that TransAmerica simply must have, say, an intranet, the next step is to

CIO RESEARCH ORGANIZATIONS

LARGE RESEARCH organizations like Forrester Research, Yankee Group, Meta Group and Gartner Group lend insight about which companies and trends are important to CIOs. For an annual fee, companies get access to the latest research and discussion on a given technology. Most companies need to subscribe to more than one technology area, however, which can add up quickly—*PC Week* reports that an annual subscription to a single service at Gartner costs between $15,000 and $27,000. Fortunately, many research organizations are responding to complaints about their prices by developing less expensive newsletters. They have also made their reports easily accessible, distributing information via fax, CD-ROM, Lotus Notes and teleconferences. Subscribers can look at information from a broad management perspective or drill down to get more detail on a specific product or trend.

Forrester Research Inc.
Cambridge, Mass. 617 497-7090
www.forrester.com
Scope: 32 analysts
Lowdown: Of all the market analysts, Forrester caters most heavily to senior-level IS executives. Analysts focus on long-range strategic analysis and the impact of emerging technologies on businesses, consumers and society. Its newly launched Leadership Strategies service specifically helps CIOs stay in touch with emerging technologies.

Gartner Group Inc.
Stamford, Conn. 203 964-0096
www.gartner.com
Scope: More than 400 analysts; 5,000 clients; serves both vendors and end users
Lowdown: Gartner is by far the largest market analyst organization. Gartner's president and CEO, Manuel Fernandez, aims to make Gartner a "mini Microsoft" in its field. Nobody can beat Gartner's scope and variety of services, including @dvantage, Gartner's new online service distributed over AT&T's Interchange network.

On the downside, quality sometimes takes a back seat to quantity. Accessibility to analysts isn't always the greatest—with more than 25,000 phone calls a month, phone-line gluts are inevitable. In addition, Gartner tends to attract and hire analysts who are brilliant and opinionated but not always objective. Software developer Computer Associates International Inc. didn't feel it was getting a fair rap and decided last year to stop briefing Gartner after several negative reports.

Giga Information Group Inc.
Cambridge, Mass. 617 577-9595
www.gigaweb.com (password-protected)
Scope: 70 analysts
Lowdown: Gideon Gartner started Giga last year to take on his namesake, Gartner Group, and is hellbent on its becoming a $500 million business within five years. Giga currently is hunkering down for the fight by devising a fresh strategy and wooing the best analysts from other firms and from the ranks of IS executives. Giga's format of delivery is centered around Gigaweb, a password-protected network on the Web, and four-page focus documents on different aspects of IT.

Institute for the Future (IFTF)
Menlo Park, Calif. 415 854-6322
www.iftf.org
Scope: 18 researchers; 100 clients
Lowdown: A nonprofit, applied-research and consulting firm that uses applied forecasting and strategic planning to analyze the likely effects of emerging technologies on global business practices. Its three practices are strategic planning, health care and emerging technologies. Clients include Fortune 500 companies, government foundations and public-interest groups.

Meta Group Inc.
Stamford, Conn. 203 973-6700
www.metagroup.com
Scope: 66 analysts serving 2,000 subscribers at 840 client companies
Lowdown: The number-two market analyst, Meta is still small enough to tout its accessibility and personal attention via consultations, phone discussions, facsimiles and teleconferences. Meta Group's client-to-analyst ratio never exceeds 50 to 1; subscribers say they feel their business matters here more than it would at Gartner. Founded by two ex-Gartner staffers, Meta offers a variety of services.

Yankee Group Research Inc.
Boston 617 367-1000
www.yankeegroup.com/about.html
Scope: 520 clients worldwide, including vendors and users
Lowdown: Yankee is a relatively small organization that focuses on communications and computer systems for business, factory and consumer markets. Analysts strive to identify current trends and future directions. Mainly competitive in the telecommunications market.

–J. Bresnahan

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send products to the company's in-house testing lab in Dallas. After a product is chosen and implemented, Wiles leaves himself a one- to three-year window during which to continue researching other options in case something better comes along. He's not interested in having the newest, flashiest technology; he just wants what works best for the right price. "I'd rather let our competitors experience the pain and I'll benefit from it," he says. "There's no rocket science here."

SKIRT THE EDGE CAREFULLY

SOFTWARE DEVELOPER Cincom Systems Inc. of Cincinnati, on the other hand, needs to be sharper than cutting-edge for the sake of its customers. For example, its banking customers need state-of-the-art technology to protect their traditional turf against encroaching financial services and technology companies; if Cincom can't deliver, banks will go elsewhere. Keeping Cincom customers one step ahead means Cincom needs to be two steps ahead at all times. Marco Emrich, senior director of the advanced technology group, accomplishes that by carefully nurturing ties with other vendors. He attends more than a dozen briefings a year and constantly checks the Web for product announcements. If something promising pops up, he sends his IS group to the company to investigate. Being alert enabled Emrich to hear about a new capability developed at Microsoft that Cincom promptly incorporated into the development of its own product.

"There isn't just one way to keep on top of new technology. You can't do just one thing."

–Frank Caccamo

These are all good ways of keeping up with technology, but there's still no guarantee that the CIOs aren't overlooking the one component that could make or break their companies. They just have to take their chances. But CIOs inclined to gripe should know that it doesn't get any better than this, says John Parkinson, director of E&Y's Emerging Technologies Research Practice. "It's never been so hard to keep up as it is today," Parkinson says. "But that's the good news—because it'll never be this easy again." CIO

Staff Writer Jennifer Bresnahan can be reached at jennifer@cio.com.

Beyond the Pitch

Vendors can clue you in to market changes

VENDOR-SPONSORED TECHNOLOGY briefings or user conferences are popular avenues for keeping current. As long as participants can get past the vendor's obvious agenda, these events reveal where vendors think the market is going. Unfortunately, the shows are time-consuming and may not offer much material, says Lance Thomas, president of Oak Brook, Ill.-based consultancy Interim Technology Inc. "You might get 10 quality minutes out of a three-hour presentation," he says.

CIOs can make better use of their time by fostering one-on-one relationships with vendors. CIOs should take a more active role in shaping the direction of the market instead of reacting to vendors, says Julie Merringer, an analyst with Forrester Research Inc. When Unisys Corp.'s Dewaine L. Osman, for example, had to decide between Lotus Notes or Microsoft Exchange, he called the CEOs of Microsoft and Lotus Development to get the latest word. Frank Caccamo, vice president of management systems for Procter & Gamble, talks with developers and executives at Microsoft, MCI, Hewlett-Packard and IBM at least once a year to let them know what kinds of service and technologies P&G hankers for. Obviously, not all companies can finagle this kind of high-level access with a vendor, but CIOs don't need to speak with the CEO to get valuable information.

Knowing which vendors will remain players in the long term is difficult, but assuming that the big boys are the only ones who will spawn market-dominant innovation is a mistake, says Parkinson. "You're guaranteeing that the real big [changes from unlikely sources] will always be surprises because they always come from outside," he says. "Disruptive technologies never show up from an established vendor scan." A better option might be to let a neutral third party figure out the year's hottest vendors. Boston-based consultancy Open Systems Advisors Inc., for instance, does the legwork for busy CIOs by publishing the "Cross Roads A-List," a consumer report of the year's hottest products in the enterprisewide client/server environment. The company looks at about 200 vendors each year but narrows the field to the 60 best products, eliminating the guesswork for busy CIOs. At the end of the year, the company hosts the "Cross Roads Conference," where CIOs can interact with vendors of the best products.

–J.Bresnahan

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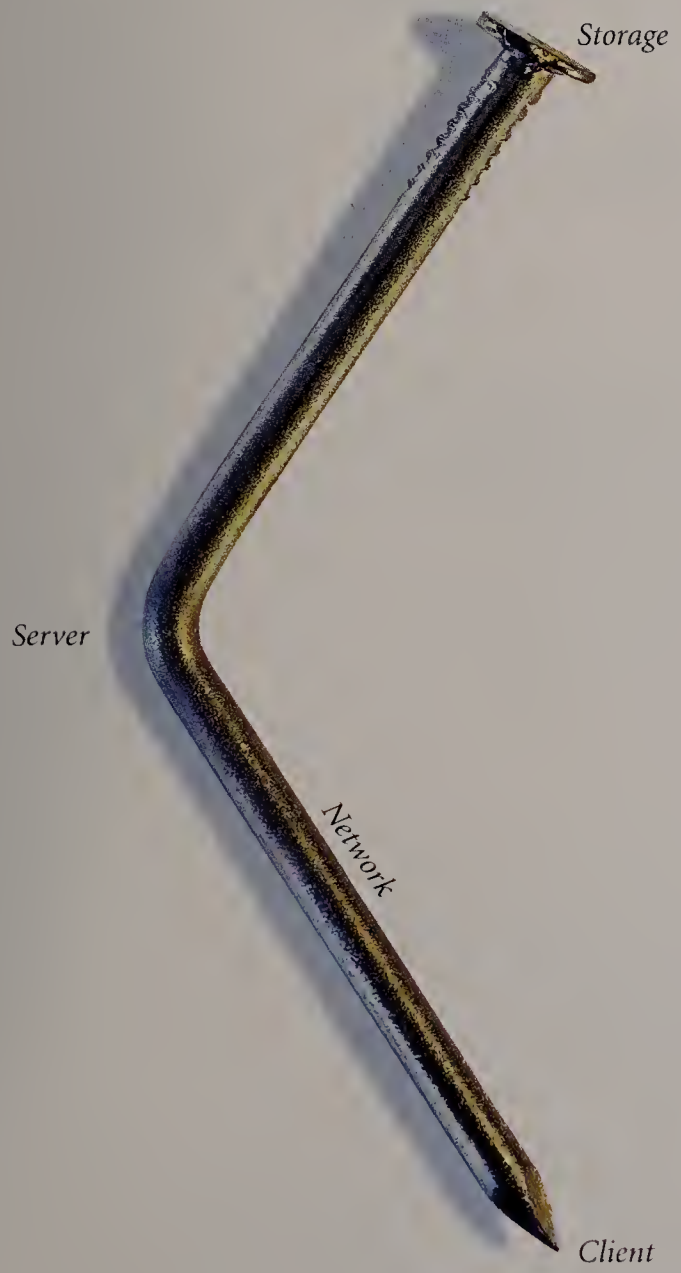

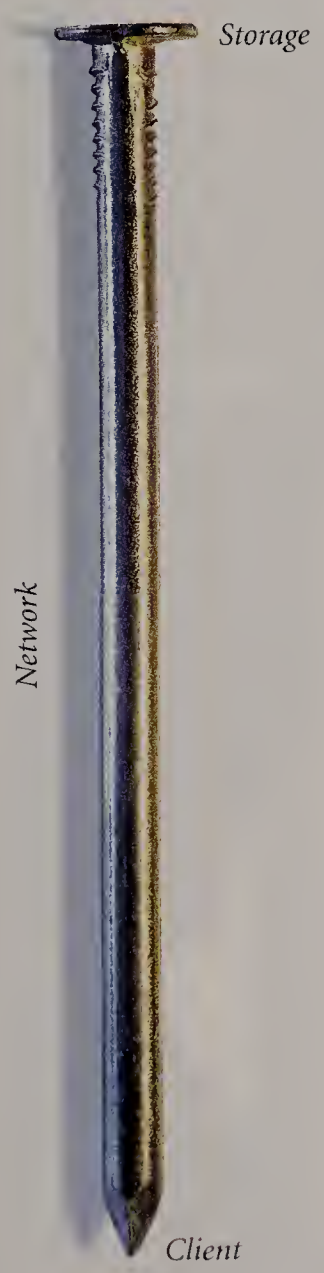

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Proceeding with Caution

When Standard & Poor's turned an analytic eye toward its own infrastructure, it found an ailing legacy system in need of an overhaul. As the bond-rating company built a customized client/server architecture and pulled the plug on its mainframe, it was also careful to minimize its risks.

BY TRACY MAYOR

STANDARD & POOR'S is in the business of analyzing risk. So it's not surprising that the New York bond- and credit-rating bureau concocted an elaborate plan for making its own risks as small as possible as it embarked on a massive—and massively expensive—client/server implementation.

An old, established company shaken by new business realities, Standard & Poor's has been rating debt in public markets since 1916. Business boomed into the 1980s, until the stock market crashed in 1987. And like a lot of other companies with fortunes tied to the vagaries of Wall Street, S&P suddenly realized that it needed to expand its basic business or wither on the vine.

In 1991, a soul-searching off-site meeting of the company's senior executives produced a new mission statement and a new vision. The plan was to apply the company's core competencies—risk

Reader ROI

CLIENT/SERVER MIGRATIONS are never simple, nor do they always run according to plan. This story contains information on:

- How to limit the risks of large client/server implementations
- Strategies for delivering bulletproof systems—on time

PHOTOGRAPHY BY ERICA FREUDENSTEIN

Robert Maitner, executive vice president, framed the problem in financial terms: Standard & Poor's was paying their analysts to do data management rather than analysis.

Chris Rousseau was Standard & Poor's point man for application development, among other tasks.

Jeffrey Tucker was part of the team from Booz, Allen & Hamilton, which was paid $1.5 million for its role in the project .

Ken Moskowitz was the CIO who piloted the company through the change.

analysis and information service—to instruments other than bonds and to international markets as well as domestic.

Unfortunately, S&P's technology was not sufficiently up to snuff to support that diversification. The company's legacy system was unable to keep pace with the demands of modern financial markets. "When I came to the ratings group in late '89, we were operating with a mainframe that was using 1980 technology at best," says Executive Vice President Robert Maitner. "The only people who used the system were [those who] reported directly into IS."

To access information from S&P's mainframe-based repository, analysts had to describe their needs to a programmer and wait 48 hours or more for a report. Or, as was becoming increasingly common, they would work on their own PCs using data they had hoarded locally. "Analysts were spending more time getting information than they were analyzing it, and critical information wasn't being shared across the company," says Ken Moskowitz, who was hired as CIO in 1992.

Maitner puts the problem in financial terms: "Two-thirds of our costs are associated with people, but we were paying our analysts to do data management rather than analysis."

In The Spotlight

Locations: 16 offices worldwide

Employees: 1,300

Nodes: 1,400 Intel Corp. Pentium and 486-based Dell Computer Corp. clients (1,100 simultaneously active at peak)

Servers: 15 Sun Microsystems Inc. SparcAS servers, 39 Banyan Systems Inc. Vines File/Router servers globally

Storage: One terabyte of usable disk storage fully mirrored with RAID-0 and RAID-5

Physical Network: 10Base-T collapsed Ethernet, WAN connectivity to global sites via frame relay

Operating Systems: Oracle 7.1 environment, Sun Solaris 2.4, Banyan Vines and Windows 3.11, transitioning to Windows NT

And even a newly energized systems staff couldn't deliver a brand-new architecture without an infrastructure in place. The company would have to invest in new PCs, operating systems, networks and servers capable of handling such an ambitious system. (Some efforts to bring more power to the desktop—including swapping terminals for desktop PCs and adding basic connectivity—were already underway at the time those decisions were being made.)

> The switch to client/server has transformed the way S&P's analysts work by letting them perform rapid ad hoc queries against multiple relational databases and create customized reports almost instantly.

BUT CHANGING ONE PART OF THE system was akin to pulling a loose thread on a sweater. In mid-1993, Moskowitz and some other senior managers found themselves unraveling the entire corporate technology system. The company couldn't develop a scalable, user-powered system without simultaneously reengineering IS from mainframe custodian into a service-oriented shop.

Maitner, Moskowitz and Chief Ratings Officer Leo O'Neill swallowed hard and committed to a project that would take 18 months and cost millions of dollars. One big-ticket item would be intensified help from Chicago-based technology and management consultancy Booz, Allen & Hamilton Inc., which had worked with management to review operations and develop a business plan (see "The Consultant Connection," Page 72). The company realized it would also have to hire a slew of specialists, including business-process experts who controlled the workflow issues and object librarians who constructed the objects library. And there were the costs of the new infrastructure, including hardware, operating systems, and local and wide area networks.

The overarching goal was to create a system that could change as the company changed rather than one that would answer S&P's current needs but be obsolete in five years. "We did not want this to become another legacy system," Moskowitz says.

SO A CENTRAL COMMITTEE, WHICH included S&P's chief financial officer, CIO and operations directors as well as Booz, Allen representatives, sat down and devised a plan. IS—aided and abetted by Booz, Allen-supplied developers and project managers where necessary—would build and populate Oracle relational databases to house current and historical ratings as well as data on various organizations and instruments. That would be followed by a series of client-side applications that could be plugged into the database and customized for different types of users. Analysts, for example, would use an application with a familiar spreadsheet-like interface. The interface for the data management staff mimicked a database interface.

The project was divided into three coordinated teams—the Corporate Repository (CORE) database/legacy data conversion team, the application and class library development team, and the information dissemination team, which handled programs related to S&P's 60 publications as well as its online services. Using Powersoft Corp.'s PowerBuilder to develop simultaneously a companywide library of reusable objects for the applications, programmers would be able to leverage their work in one business unit to develop or modify applications quickly in another business unit.

A routine that extracts data from spreadsheets, for example, could be added to the library after it was built, then reused in other, unrelated applications, explains

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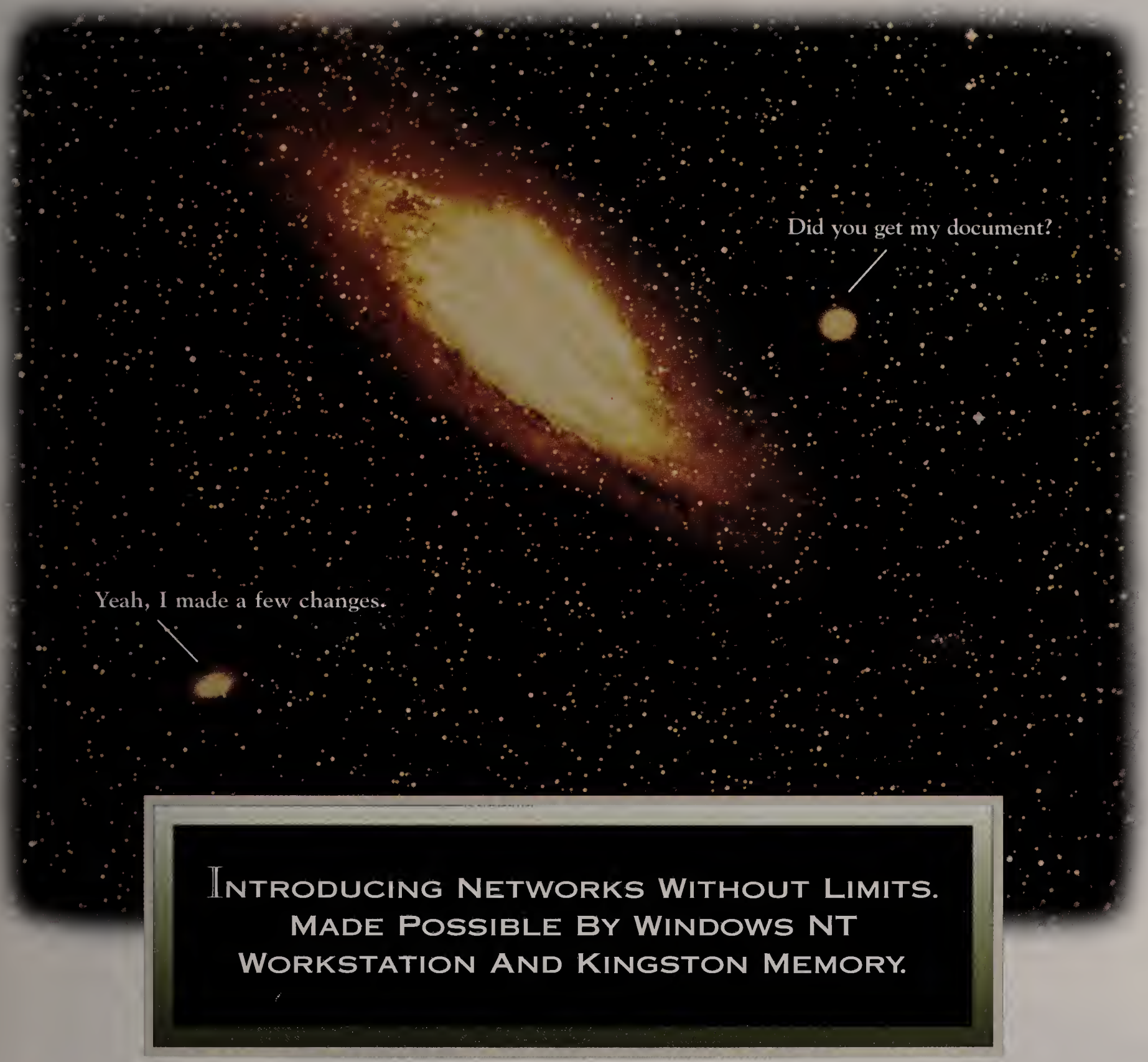

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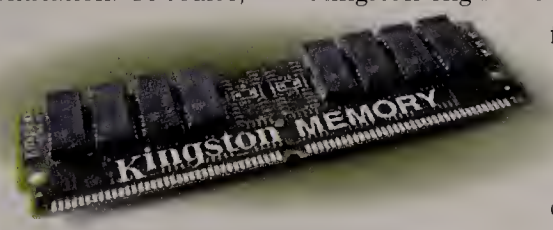

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Moskowitz. Another advantage: "When someone takes an object out of the library, it's been tested and debugged, so you know it works."

Chris Rousseau, who began work on the project as a Booz, Allen employee and is now S&P's vice president of application development, headed four development teams: application development, data conversion, publications, and reporting and inquiry. One early challenge for the programmers, he says, was resisting the urge simply to reprogram old work patterns into a client/server architecture.

"The [legacy] system had over 300 reports, and we initially were faced with this daunting prospect of trying to build 300 to 400 different reports," Rousseau explains. "Then we discovered a huge portion of those were developed because there was no ad hoc inquiry capability." Once programmers built client-side inquiry tools for the CORE database, there was no need to re-create every legacy report. Queries could be filled by grabbing information from the database on the fly rather than creating an individual, specialized report for each query. "Now we have 20 standard reports that are used with great frequency, plus a handful of more complex reports," Rousseau says. "That's it."

OF COURSE, S&P WASN'T LIKELY to pull the plug on its mainframe and institute an entirely new computing paradigm without risk control. Moskowitz and Jeffrey S. Tucker, a vice president with the Information Technology Group at Booz, Allen, developed a risk management system that comprised iterative prototyping on the front end and a parallel testing plan on the back. That process, which early on produced working prototypes of the database and its related applications, was critical to the success of the project, Moskowitz says.

"I was trying to do two things at the same time," he explains. "I wanted to make sure we were defining requirements as a [business-driven] project rather than as an IT project, and I wanted a heavy technical shakeout as we went along." The programming team built a skeleton of the forthcoming infrastructure and a database loaded with real and test information and immediately was able to begin testing the rela-

The Consultant Connection

Standard & Poor's put a lot of faith (and a lot of money) into consultant services to turn its IT around

"We helped determine what the database would look like, what the right data architecture would be to drive this business."
–Jeffrey Tucker

BOOZ, ALLEN & HAMILTON INC. is well known in IT circles for its expertise in information systems, operations strategy and change management, but it's understood that the company's services don't come cheap. Just ask managers at Standard & Poor's. The New York-based bond-rating and risk-analysis company paid Booz, Allen $1.5 million during the 18 months it spent building and populating the new relational database, class library and suite of related analysis and publications applications. Still, S&P is convinced the money was well spent. "To guarantee success," says S&P's CIO Ken Moskowitz, "the first thing we did was hire Booz, Allen."

Jeffrey S. Tucker, a vice president with the Information Technology Group at Booz, Allen, is more specific about his company's involvement. "We helped determine what the database would look like, what the right data architecture would be to drive this business," he says.

Beyond the early input into strategic planning, the consultancy's main value to S&P was in staffing and recruitment, says Moskowitz. Strategic planning teams included S&P managers, Booz, Allen specialists and S&P technical staff.

"We worked with the consultants for their ability to talk with analysts on more of a peer level."
–Chris Rousseau

Booz-recruited specialists spearheaded specific development efforts, and their responsibilities gradually were turned over to S&P employees once the project was underway.

By using the consultancy to locate and bring in key people, such as the object architect, S&P did not have to delay development phases while it staffed up. "It gave us the freedom to hire without the stress of missing all of our deadlines," says Moskowitz. "We had a much better idea of what skills we were looking for."

Individual departments used Booz, Allen as a liaison between the technical and user communities, such as when the application development team was trying to determine how data "silos" in the legacy system should be dismantled and rebuilt. "It was a challenge to the conversion team to take data from data silos and match it to the way the [user] thinks," explains S&P Vice President of Application Development Chris Rousseau, himself a Booz alumnus. "We worked with the consultants for their ability to talk with the analysts on more of a peer level" to determine their real-world data needs, he says. *–T. Mayor*

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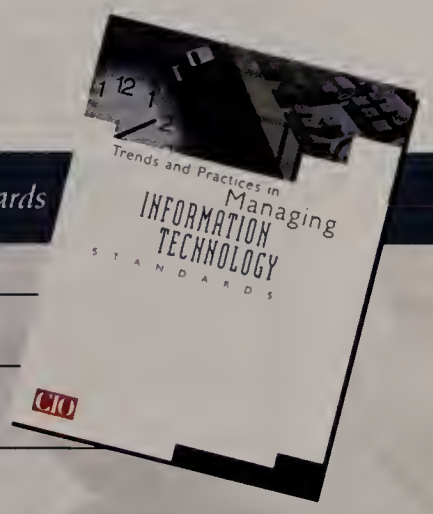

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tionship between the two components.

A working prototype helped define the limits of the project and build consensus. At first, "people would think there was agreement when there wasn't," Moskowitz says. "But when people got to see something and physically use it, they'd say, 'Oh, that's what I said, but it isn't what I meant.' And we could fix it rather than have to wait three months and then redo it."

The prototype also made it easier to pinpoint trouble spots. "We used the prototype to illustrate issues that were coming up," Moskowitz says. "[Testers] could say, 'See? Watch how long it takes me to perform this function.' And the software would be right in front of them."

To test the prototype, Moskowitz commandeered a large conference room, set up 10 terminals (including one in a separate building to mimic an authentic LAN connection) and asked analysts, data managers, directors of operations and other "friends of the project" to work with and comment on the software as it evolved. "We tested actual working sessions with groups of people," he recalls. "We ran the most demanding transactions while we were running reports in the background. We learned which transactions were the most time-consuming and where the system was being stressed."

While Chris Rousseau's teams were busy programming, another group was overseeing the Herculean task of outfitting some 1,300 desktops, myriad servers and the connections between them to support client/server.

"In the beginning, we didn't even have Windows," says Doug Taggart, S&P's vice president of business technologies and support, whose team was responsible for installation, training and user support. "And the first rollouts [of new applications software] were done manually. We went from desk to desk and installed EXE files manually."

"The effort was monumental," Moskowitz says. "The logistics involved in a large rollout are always underestimated." The infrastructure support team moved users first from terminals to DOS PCs and then to Windows 3.1; they are currently upgrading to Windows NT. To support client/server systems, they installed Banyan Systems Inc. local area networks, added remote access components (including TCP/IP) and built a Sun Unix client/server environment. They also installed a variety of business applications, such as word processing, spreadsheets, calendaring software and real-time news feeds.

BY UPGRADING THE SYSTEM OVER time and in waves, the team gained invaluable experience for the switch from the mainframe to the new CORE architecture.

"Each one of these waves allowed us to learn a little bit more, and each time we used the previous project's plans and experiences," says Moskowitz. "By the time we rolled out the major effort, we were on our fourth or fifth big wave."

To manage the sheer number of hardware and software elements required by such a large project, Taggart's team built a searchable inventory listing each desktop PC's complete configuration. That allowed the support team to find out in an instant what disks, connections, hardware and supporting software were required and how much RAM a computer needed to run a new piece of software.

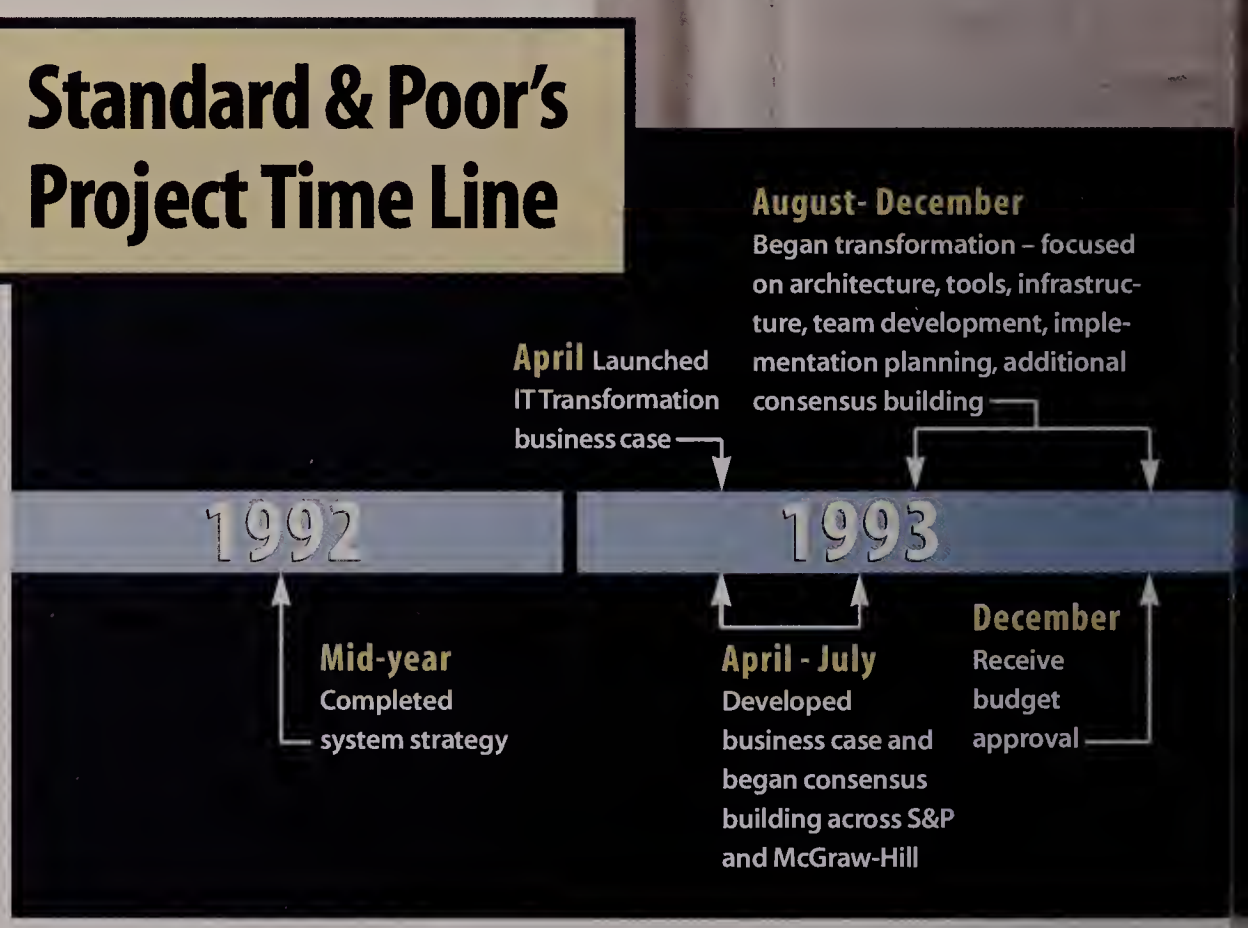
By the same token, training was viewed as ongoing and iterative rather than static. "We had to make sure people were trained in the application we were rolling out, but we also needed to make sure they knew how to use a PC and Windows first," says Moskowitz.

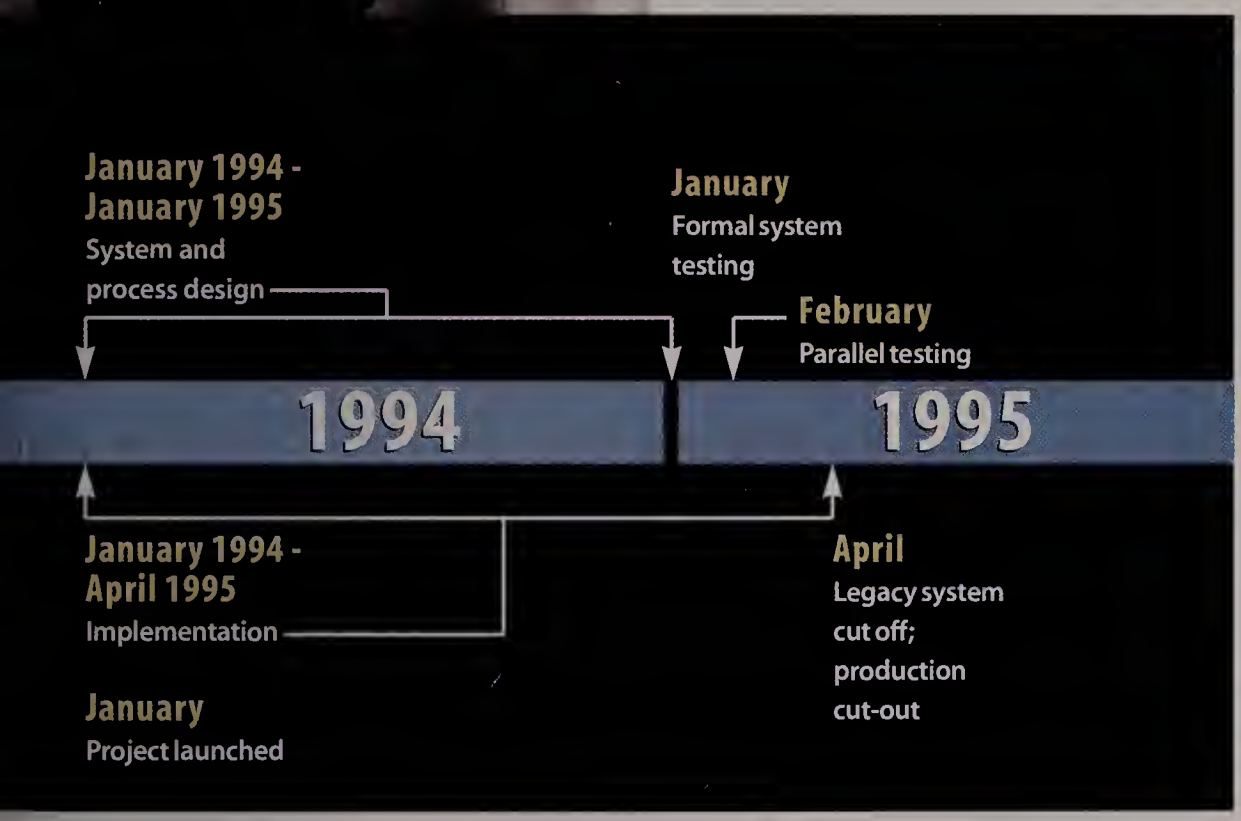
The support team found it most effective to coordinate training and upgrading. Upon returning to their desks after a training session for a new application or service, employees would find that software or tool installed along with end-user help and documentation. That technique not only helped increase user buy-in, as people saw what Moskowitz calls "a value add on their desktop," but also drastically reduced the workload at the help desk.

"Without training, we learned, people using a new application would be calling

> "We did not want this to become another legacy system."
>
> *–Ken Moskowitz*

Standard & Poor's Project Time Line


April Launched IT Transformation business case
August- December
Began transformation – focused on architecture, tools, infrastructure, team development, implementation planning, additional consensus building
1992
1993
Mid-year
Completed system strategy
April - July
Developed business case and began consensus building across S&P and McGraw-Hill
December
Receive budget approval



impact as S&P underwent three months of parallel testing to ensure there were no surprises the day the database went live.

For workers in some departments, parallel testing meant doing the same job twice, every day. But management felt there was no other way to make the new system 100 percent fail-safe.

As part of the parallel testing, S&P actually produced two sets of some of its customer publications—one using old methods, another using CORE and the new publications platform. Moskowitz hired proofreaders to compare them. "We did find we had some deeply buried inconsistencies that were not obvious to anyone during our normal acceptance testing," he says.

In addition, data definitions and relationships needed to be refined in some cases; workflow had to be adjusted or within five minutes. There were a lot of misspent hours at the help desk," says Taggart. "Now we won't permit a [software] install to take place if someone hasn't shown up to class." During the peak period of the new architecture rollout, Taggart's four staff instructors—three in New York and one in Europe—were teaching five classes a day, organized primarily according to business unit.

THE PRESSURE WASN'T CONFINED to the IS and training staffs. As the project neared completion in February 1995, analysts, data managers, publications specialists and users felt the performance boosted in others. "Parallel was painful," Moskowitz admits. "The people involved were already working hard to get their daily work done, but there was really no way to uncover all that without using the system in the real world."

SOME 18 MONTHS AND $3.3 MILlion later, S&P had a state-of-the-art client/server architecture anchored by a mission-critical relational database housing 12GB of data on approximately 55,000 organizations and 4 million financial ratings. The database system and its accompanying class library of programming objects are surrounded by two tiers of customized applications, one for analytic operations and another for publication and information dissemination.

The switch to client/server has transformed the way S&P's analysts work by letting them perform rapid ad hoc queries against multiple relational databases and create customized reports almost instantly.

Freed from having to rethink their data needs in ways the mainframe could understand, analysts can now respond more quickly and accurately to events that affect financial markets, run what-if scenarios and spend time analyzing data rather than scrounging for it.

In turn, the company is faster to market with ratings, is quicker off the block with new products and services, and is more efficient with its in-house operations.

Organizationally, S&P can respond better to business needs by leveraging past work to create new products and services. Best of all, in Maitner's view, the company can focus on its next business initiative without fretting over its technology infrastructure. "We have the technology for the next five-year expansion, and we know it supports the business," he says.

For IS, the project has paid off in more than just increased efficiency. For the first time, IS is on a level playing field with other departments. "The project transformed the IS function at Standard & Poor's...to being a real partner with the business," says Tucker. "[Now IS] can support new products, new services and new operational efficiency. It's one of the best partnerships I've seen between business and technology." CIO

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For more information on Standard & Poor's project, visit CIO's Web site at **www.cio.com/CIO/1015/96_sp_sidebar.html.**

Tracy Mayor is a freelance writer and editor based in Beverly, Mass. She can be reached at tmayor@shore.net.

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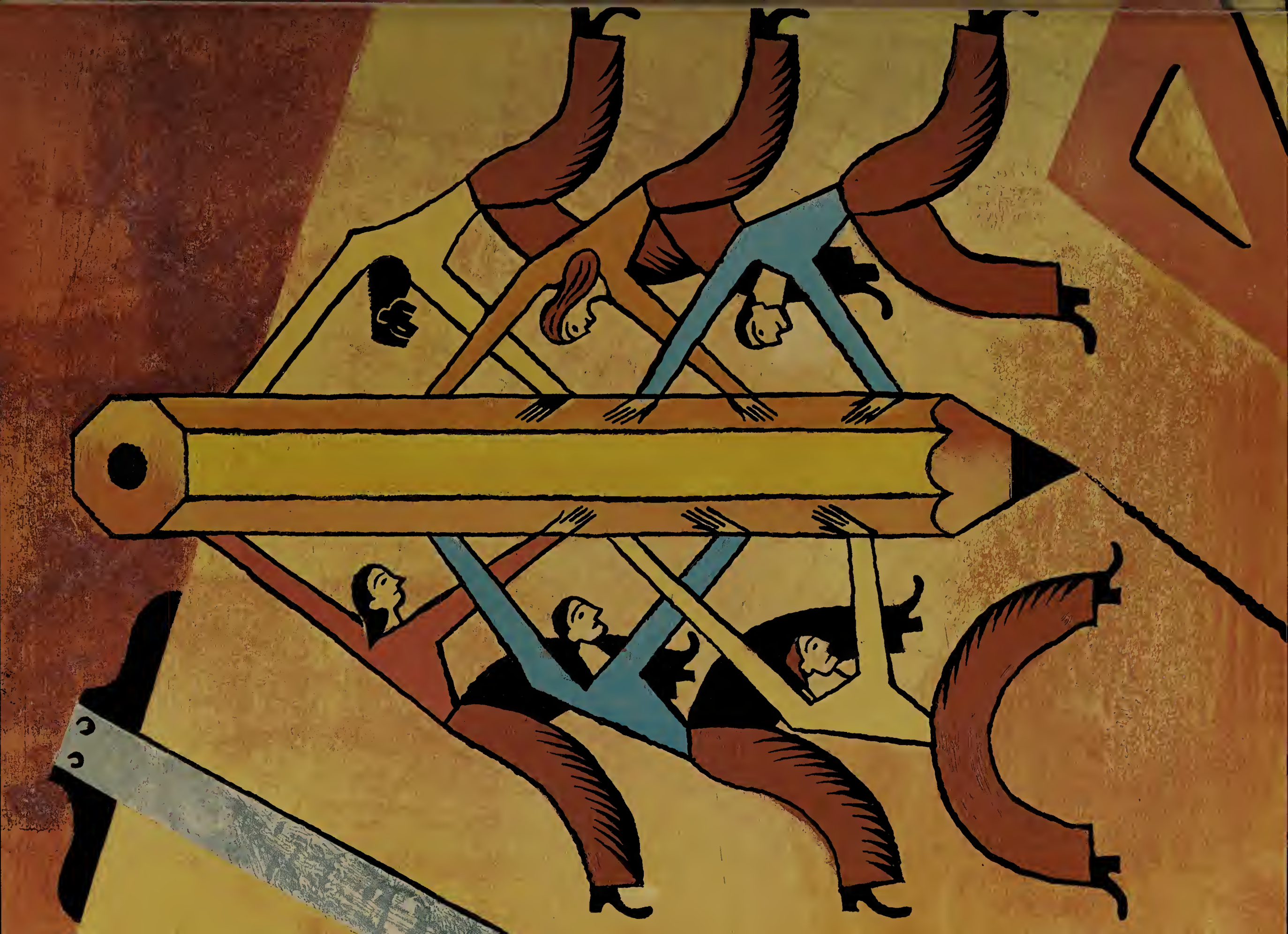


Dream Team

Among the IT professionals on today's more innovative development teams are people you wouldn't expect to find: psychologists, social scientists and, of all things, users

BY MIRYAM WILLIAMSON

BY A VARIETY OF INFORMED ESTIMATES, nearly a quarter of all application development projects fail. Some overrun their budgets to such an extent that management simply pulls the plug. Others reach completion, but the people for whom they are built scuttle the systems because they are too hard to learn or too inconvenient to use. In either case, many of the failures could have been avoided if the development team had paid more attention to the wishes and needs of the intended users. The cure, experts say, is a technique known as participatory, or user-centered, design.

Reader ROI

INSTEAD OF ASKING middle managers to represent the views of the end user in the development process, user-centered design focuses on the input from intended users of a new system right from the beginning. Readers will discover new roles in IS development for social scientists and find pointers on economic, cultural and political considerations of a user-centered project.

The essence of user-centered design is a close relationship between developers and their ultimate customers: the people with their hands on the keyboards. User-centered design teams consist of both IT professionals and business end users, working together to define what the new system should do and how. Long on iterative exploration and short on paperwork, the technique can bring a new clarity to requirements definitions and a new sense of connection between business users and technical professionals.

User-centered design is at once an idealistic and highly practical approach to application development. The technique, in which developers often act like apprentices to those who will eventually use the new software, requires IT professionals "to learn to think of the world in customer terms rather than in software terms," says Barbara Katzenberg, a consulting design engineer with Digital Equipment Corp. in Littleton, Mass. "It's impor-

ILLUSTRATIONS BY TIMOTHY COOK

Trading Places

Anyone who has seen the chaos of the trading floor knows it's no place for systems designers to hang out hoping to learn the business

FEW COMPANIES depend more on software than does the New York Stock Exchange, where the ability to handle millions of transactions each day without a hiccup is fundamental. One of the NYSE's crucial applications, Display Book, was 10 years old in 1992 when the company opted for a user-centered approach to phase in new software and hardware for stock specialists on the trading floor. "Because of the volume of orders that come to us from all around the country, users must be able to complete the report of a trade or quote every few seconds," explains Mark Wille, the Display Book project's managing director. "It's unbelievable how heavy the workload is."

So developers for the new project undertook an evaluation of the workflow of trades and quotes, Wille says. But unlike companies whose managers can direct workers to meet with developers, the stock exchange is made up of traders who are members, not employees, with enormous pressures and their own businesses to run. So developers met with the managing partners of member companies, who were not necessarily the ultimate end users. The purpose was to get as close to the end users as possible without asking them to stop earning money for their companies while they sat in meetings. End users eventually got involved in testing pieces of the system in the stock exchange's usability lab.

"We recognized that the specialists were our customers," says Lois Zarembo, vice president of the stock exchange. "The better we helped them run their business, the happier they would be, and the happier we would be." Zarembo and Wille recruited trading specialists to come to the usability lab before and after trading hours to test prototype enhancements to Display Book. Zarembo says she went after the most experienced traders because their activity levels were the highest.

One of those seasoned traders was Jerry Mahoney, a partner in CMJ Partners LLC in New York. He headed the exchange's technology committee, so he was a logical person to recruit. Once or twice a week, he says, he went to the NYSE usability lab two hours before the 9:30 a.m. trading bell. The lab was set up like a trading post on the stock exchange floor. "They'd try things out to see how we reacted," says Mahoney. "Some people were watching us through one-way windows and videotaping us. They'd have us try two or three ways of doing things to see which was faster.

"What they've put on the floor that is new has been excellent," he adds. Portions of the new system, which is still being developed, have been deployed for tracking stock quotes and sales. ***–M. Williamson***

tant that people have control over the tools they use to improve the quality of work life."

But user-centered design teams are not just starry-eyed dreamers. They see economic benefits in focusing on the intended user rather than the technical aspects of the project. Joining the IT professionals are a growing number of people with degrees in an assortment of disciplines—anthropologists, ethnographers and other social scientists (see "Think Tank," Page 48). Rounding out those development teams are members of yet another group rarely heard from in conventional development efforts: the people who do the work those systems are designed to support, such as clinical-care practitioners, broadcast journalists and trading specialists.

"There are horror stories galore about great new technologies that fail because they are not suited to the way people work," says Susan Anderson, manager of the work practice and co-development group at Xerox Corp.'s Architecture and Document Services Technology Center in Rochester, N.Y. One such story tells of a snazzy new file management system designed to allow users to scroll through a list of file names 20 characters wide. To users, however, the names were indistinguishable because they often were identical except for the last few characters, which did not show up on the screen. The project was a failure; time and money were wasted simply because no one on the development team had anticipated the needs of a real user.

"Existing methods of developing applications for the work that people do are usually not good enough," Katzenberg says. "They're too oriented toward things that are relatively superficial compared with how well the tools fit what the worker is trying to accomplish." To build a clinical information system for the breast cancer clinic of the National Naval Medical Center in Bethesda, Md., she has immersed herself in "how medicine happens," noting the gap between observers' assumptions and what doctors and nurses actually do all day. "How day-to-day routine activity actually transpires in the clinic isn't described anywhere," says Katzenberg. "Doctors and nurses are usually in crisis mode. They have a lot of people to

worry about. Yet, if a detail of a patient's care falls through the cracks, it can have very bad consequences for the patient."

Typically, IT professionals think of the managers and supervisors who request new business applications as the customers they must satisfy. So developers interview *them* when they are defining systems requirements, not the ultimate users. But rarely do middle managers know in detail how their subordinates really work, and the nuances that would make a new system really useful are lost in translation between managers and developers.

"I'm a manager myself," says Anderson. "My job involves representing our work to the rest of the company, making sure that there's funding, going to conferences and staying up-to-date. I don't know what is going on in the office next to me at the level I need to know in order to specify requirements for software development."

THE ESSENCE of user-centered design is trying to understand the user's rationale for getting work done, says Finn Kensing, an associate professor of computer science at Roskilde University, near Copenhagen, Denmark, who recently led a user-centered design team that brought multimedia systems to a radio unit of the Danish Broadcasting Corp. "And that's where ethnographic techniques come in. One reason so many large, important systems are not being used, or that users have to work around the system to get the work done, is that the programmers didn't understand what the users were doing. They develop the application according to their own interpretation," Kensing says. "In order for the vision to be realized, it must be deeply rooted with management, with those who will carry out the implementation and with users."

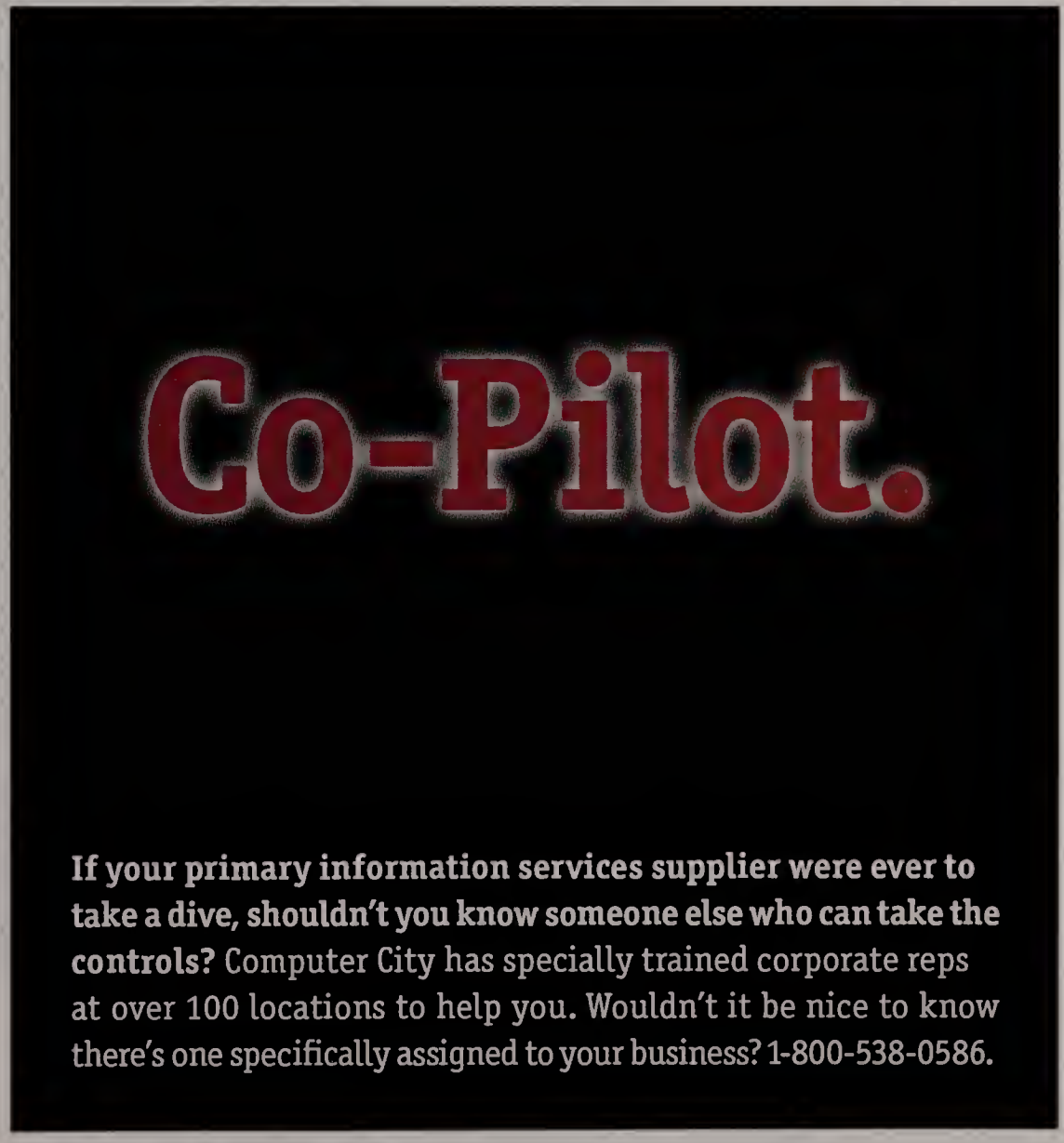
Instead of delivering a written specification—which typically consists of several hundred pages and requires dozens of sign-offs and revisions that can be overlooked when coding is done—practitioners of user-centered design furnish a simulation capable of doing real work, says Charles Mauro, president of Mauro & Mauro Design, a consulting firm in New York. "The probability of success is orders of magnitude higher because most of the major problems today [in application development] surface from poor usability." Executives don't always understand how usability affects the bottom line, Mauro says, because the costs associated with poor usability are not line items on the budget. "The core theoretical basis of user-centered design is the transfer away from a technology-centered, feature-driven design. These two techniques are like night and day."

"WHEN I TELL A CIO
the development project will cost $500,000 but will cut training costs by $400,000 a year for the next five years, it makes a lot of economic sense."
– JOHN LOVGREN

John Lovgren, a partner at Kalin and Lovgren Associates in Austin, Texas, practices what he calls performance-centered design. Its goal, he says, "is to develop a system that will allow the user to perform as rapidly as possible. You design things with a goal of allowing the user to be effective immediately."

Money spent on that kind of development, Lovgren says, is recouped through decreased training costs. "When I tell a CIO the development project will cost $500,000 but will cut training costs by $400,000 a year for the next five years over the life of the system, it makes a lot of economic sense," he says.

The cost of fixing an error increases as a project moves from one phase to the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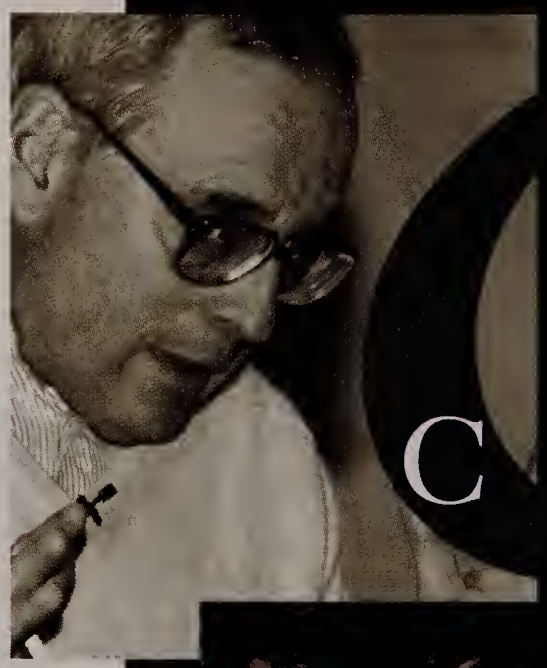

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next in a conventional waterfall development process. A rule of thumb in development circles says an error in requirements discovered in the design phase costs 10 times as much to repair as it would have if discovered in the analysis phase, 100 times as much in the coding phase and so forth. "The basic idea is if you spend more time upfront, you save time and problems later," Kensing says.

THE DEVELOPMENT *process is iterative; clients point out problems with the working model, developers fix those problems and the software goes through cycle after cycle of exploration and revision.*

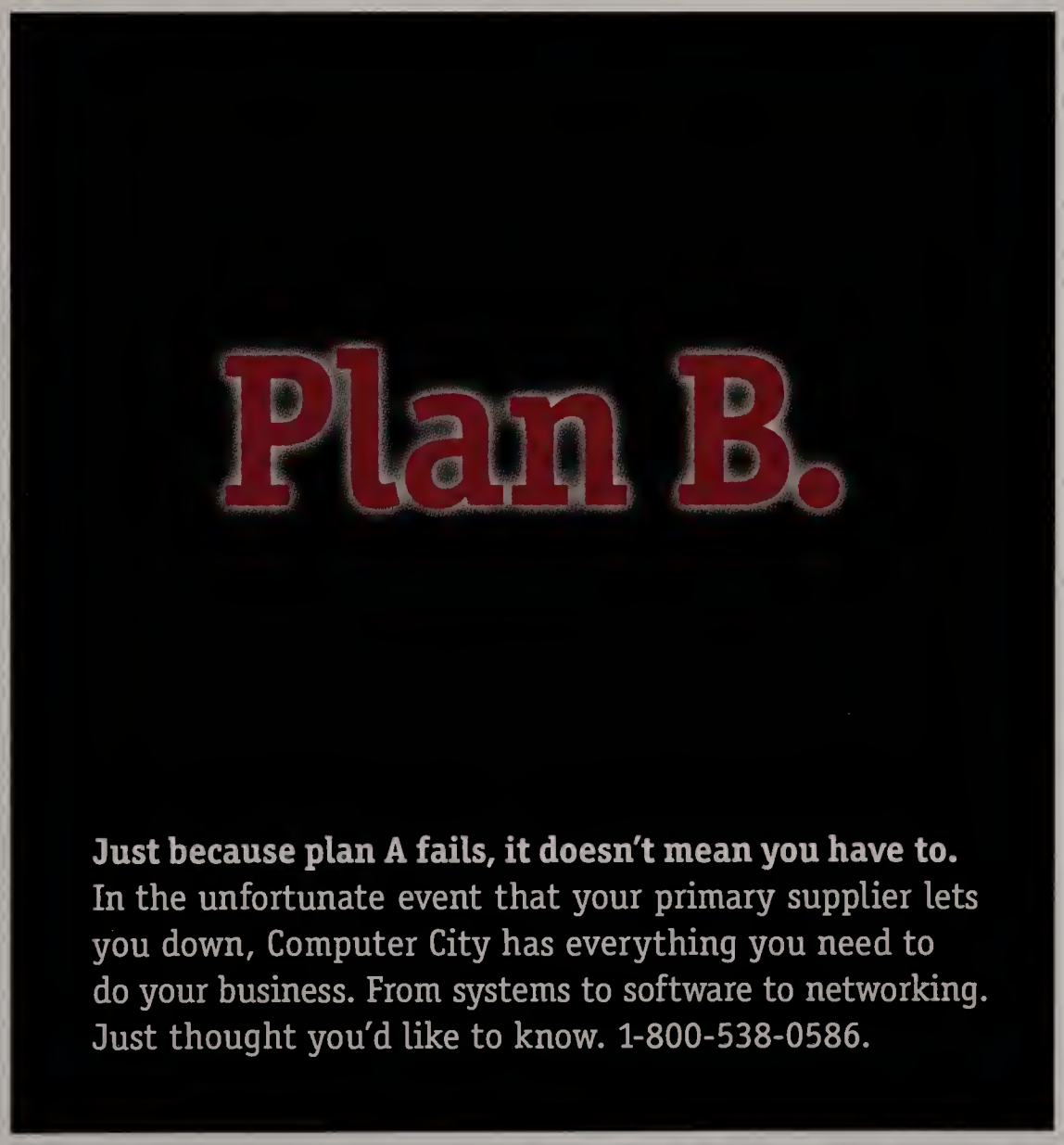
Some companies undertake user-centered design projects because they want to change the way people work. But even if that is not the intention, it is usually a consequence. Lovgren describes a financial services company that used to work with its clients to obtain financial information but later asked a specialist to create the financial plans. The company took an average of 95 days to prepare a client's financial plan. With its new user-centered design project, however, one person can collect the information, key it into the application and create the same plans within a couple of hours. That change led to a departmental reorganization because the people who dealt directly with customers could create plans themselves rather than gather the information and turn it over to another department.

Well-known successes in user-centered design include the Expo '92 Guest Information System built for the World's Fair in Seville, Spain, and the lobby information system for the American Museum of Natural History in New York, which were both designed by IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y. John F. (Jeff) Kelley, who has a PhD in engineering psychology and is trained in ergonomics, worked on both systems. He says such projects succeed because end users are involved from the beginning, and the same is true of business-oriented applications, such as an automobile finance system he helped build for use in dealers' showrooms.

"In the case of a business solution, we become apprentices and learn all phases of the business," Kelley says. "We learn what staff jobs are like and how to fill out forms so that we have an intuition about their problems. And at the same time we're learning their business, we're teaching them about our technical capabilities. That's how we build rapport with the customer."

The users help the designers learn what's involved in their jobs, then use the prototypes and comment on them. The designers go back and make incremental changes, and the users use and comment again and again until everyone is happy with the product. It's totally different from a conventional project in which managers tell developers what they think the users do and then the developers go off for a couple of years and come back with a product that may or may not have anything to do with the users' reality.

ANYONE WITH a stake in the development project's outcome should be part of the planning process. Kelley points out that the people who use bank machines, for example, are not the only ones who should be consulted about the machines' design. Bank employees are responsible for maintaining the integrity and security of the databases affected by ATM transactions. "If you've included that constituency in your original planning and made them and the people who will use the ATMs partners in the design, then you have a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much better chance of building a successful application," Kelley says.

One design project Kelley recalls was a desktop purchasing system that would allow employees to order the supplies and equipment. "We gave them the ability to buy things by looking at pictures and clicking on things they wanted to order," he says. Users liked the system because they knew they would get the product they wanted, but Kelley's additional task was to tie the purchasing system into the corporate purchasing and accounting databases. The design team spent time in the back office learning how the people there worked: what data the accountant needed, when to fill in the purchase order and what follow-up was required, for example. Kelley says his team also learned from department managers that "they wouldn't want to fire up the purchasing system just to approve a request sent in by an employee." To meet that requirement, developers linked the purchasing system to an electronic mail database to notify managers when a purchase needed approval.

TO APPLICATION developers trained in the traditional waterfall method—in which requirements are frozen before projects are handed off to the designers, design remains static while coding takes place and testing begins only after coding is complete—the user-centered design process may seem chaotic and risky. Typically, the development team meets with users at their workplace, often armed with tape recorders or video cameras. They ask users to think out loud as they work, looking for procedures and terminology specific to the job at hand. Some practitioners follow the interview sessions by giving users interview transcripts and a description of the problem to be solved by the new software. Others come back with a working model of the proposed system and ask them to use and criticize it. Criticisms can include "This is too difficult" and "You don't have the steps in the order that we do them," or "This calculation doesn't come out the same way as when we do it manually," for example. The development process is iterative; clients point out problems with the working model, developers fix those problems and the software goes through cycle after cycle of exploration and revision.

"In most development organizations, there's a very strong desire to nail down the requirements and go on to development," Lovgren says. "The reality is that requirements are going to change no matter what you do, and that's when schedules start to go out the window. The question is, what do you do to get your project done in the face of that?" The answer is to use a rapid, iterative process in which developers and users try to move to a mutually agreed upon solution. Lovgren warns it may feel as though agreement comes more slowly than it would in a technology-oriented process, but in fact it may take less time.

Because IT professionals appreciate clarity, the leavening provided by people trained in the social sciences can be a blessing. "You want people who are pushing to keep things open as long as possible and some others who are pushing for closure," Lovgren says. With the right balance, partial solutions begin to appear early in the process, and work patterns change gradually as pieces of the application fall into place.

But while a user-centered design project can change the way people work, it should not be confused with business-

"IT'S NOT A REENGINEERING PROCESS, *it's really a shift in culture, particularly if the corporation's main business operates on software."*

–CHARLES MAURO

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process reengineering, Mauro cautions. "It's not a reengineering process, although it can be the driving function that changes the corporation entirely," he says. "It's really a shift in culture, particularly if the corporation's main business operates on software."

AMONG ITS OTHER virtues, user-centered design is a valuable tool for companies trying to link globally dispersed users. Having users from many nationalities and cultures working on the development team minimizes the risk of offending or confusing anyone, according to Mauro. "Information in software is heavily affected by cultural presence," he says. "For example, if you're building a home banking system for use both in the United States and in India, you need to know the implications of putting a photograph of a family from the U.S. in the user interface. In India, the men run everything and they wouldn't take your software seriously if women and children appeared on the screen."

Cultural factors are not the only considerations where user-centered design is concerned. As with any major change, politics plays a role. "Our purpose is to get a very deep understanding of what is going on, and some users might not want us to do that," says Kensing, whose research has led him to serve as a consultant to about a dozen organizations. "Intervention by a trusted executive champion can work wonders in such a situation."

Katzenberg is sensitive to the way her team's presence at the work site is presented. "If you come in and look like an agent of change, you're going to be in the middle of some controversy," she says. "To be realistic, somebody is paying you to be there, and that person or group will influence how you are perceived. It is important to get a sense of the organization and to convince people that buy-in by everyone involved is an important part of the project's success."

Of course, user-centered design is not always necessary or desirable. Systems-level applications, networking systems and anything that does not require a user-friendly graphical interface are poor candidates for involving the end users. Mature commercial software and products where developers have already had extensive customer contact, such as games, do not need the user-centered approach when upgrades are planned. But where systems are designed for the general public or a community of business workers, growing numbers of IT professionals are recognizing the value of involving the target population from the beginning.

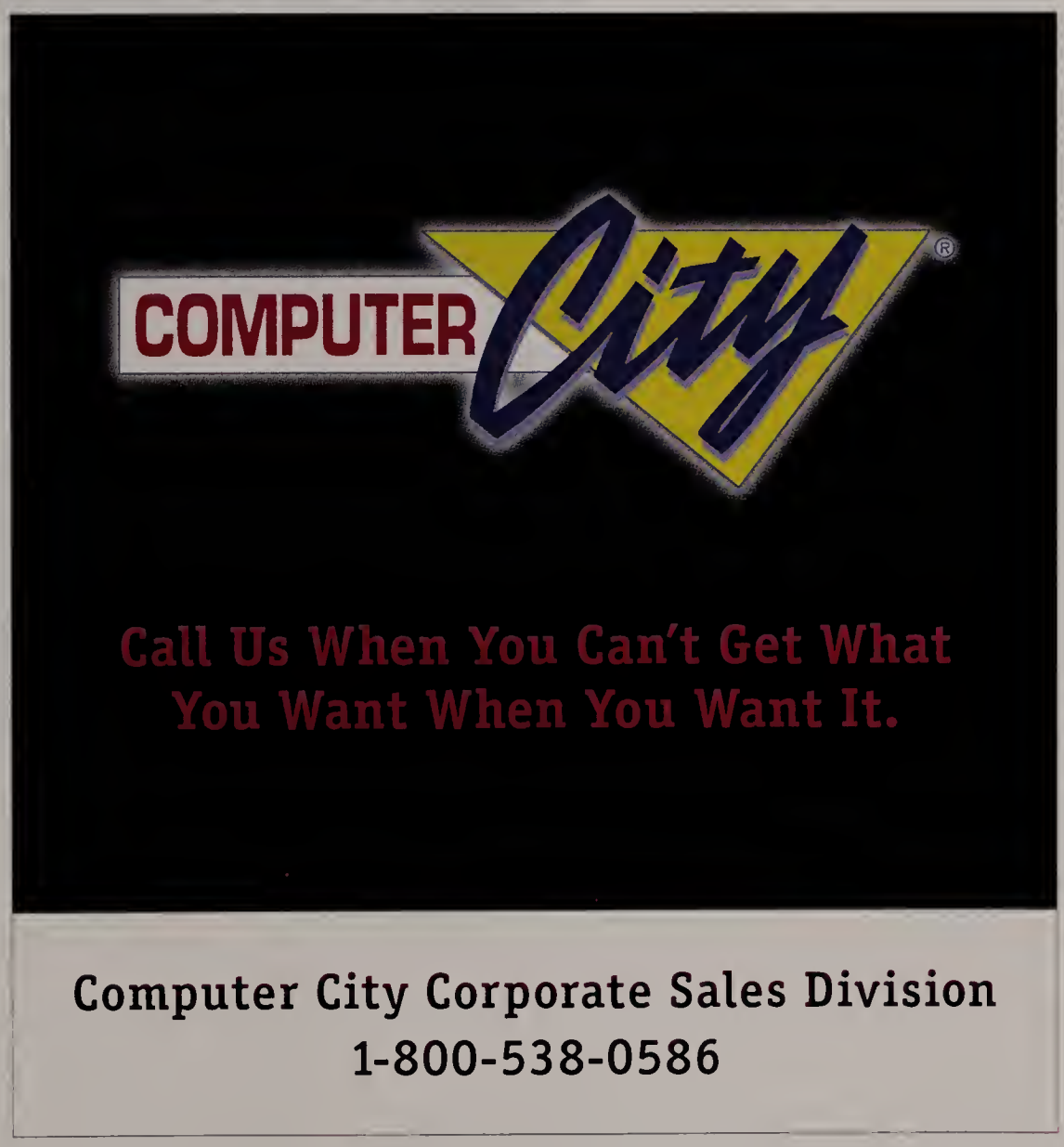
The increasing use of user-centered design techniques—virtually every major corporation has some user-centered design project underway, and consultants say their business is increasing as the practice grows in acceptance—has staffing implications that CIOs will soon ignore at their peril. "I see large numbers of companies interested in hiring people like me," says Anderson, whose master's degree is in anthropology.

"Two years from now," says Mauro, "the cost-benefit of the user-centered design methodology will be so powerful and so obvious that there won't be a world-class corporation that *won't* have a crying need to get the best people possible and the best methods to do this work." CIO

Contributing Editor Miryam (Mickey) Williamson can be reached via e-mail at mwilliamson@reporters.net.

Upcoming Conference

The fourth biennial conference on user-centered design will be held Nov. 13-15 in Cambridge, Mass. Sponsored by Computer Professionals for Social Responsibility and other organizations, the conference will include presentations, panel discussions and workshops. A companion conference on computer-supported cooperative work will take place concurrently. For more information, send e-mail to *pdc96@ncat.edu* or visit *www.cpsr.org/cpsr/conferences/pdc96/pdc96.html.*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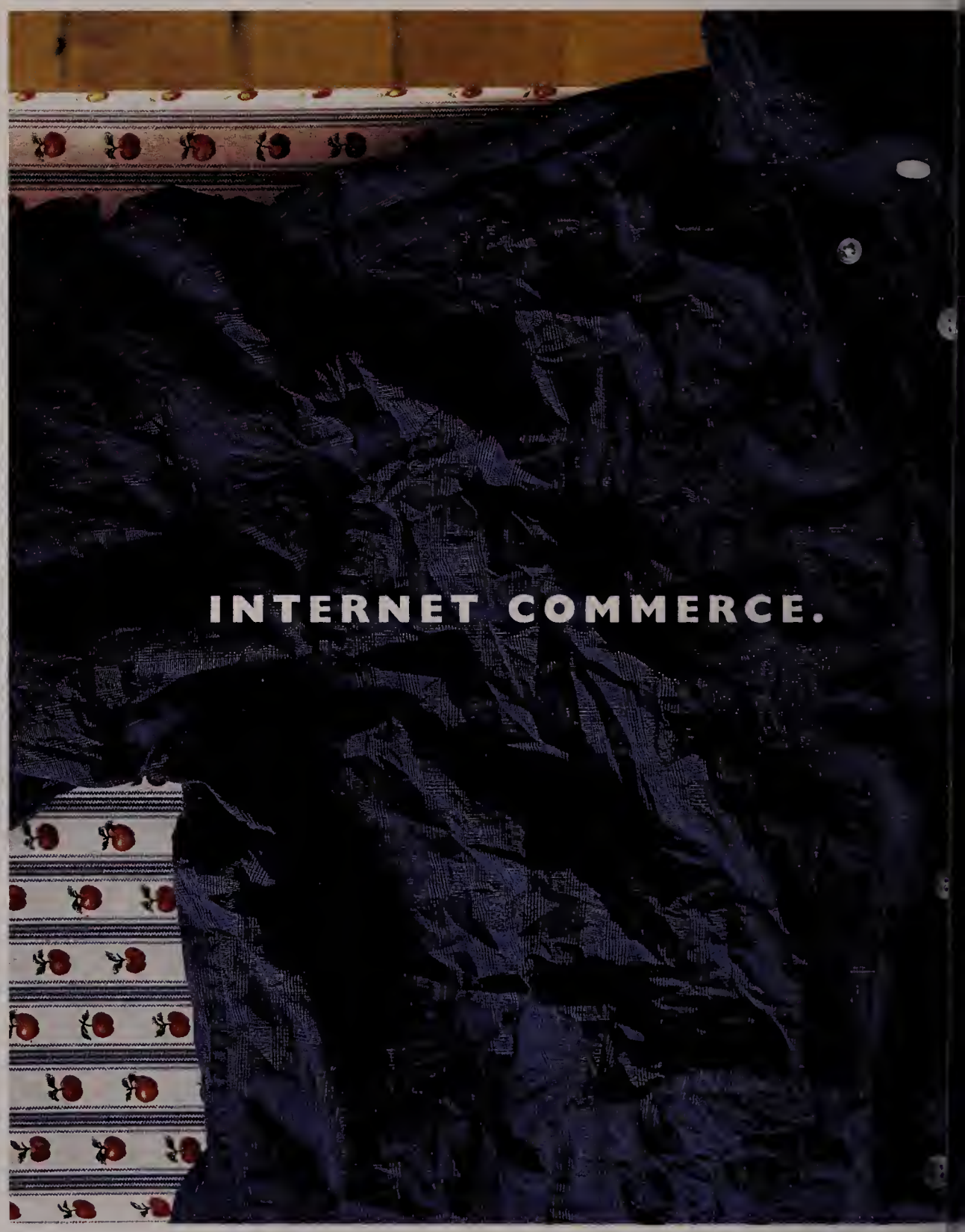

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the Virtual WaterCooler

BY PETER FABRIS

Many companies will experience virtual workgroups to one degree or another in coming years. Smart management will mean the difference between a geographically divided group and a cohesive team that gets results.

BUSINESS PUNDITS HAVE IDEALIZED the virtual corporation in recent years as an efficient, nimble organizational model. But the full potential of virtual workgroups often goes unrealized because geographical barriers present managers with unfamiliar challenges. Building trust among team members, for example, is more difficult when people are spread across multiple locations. Technology can help, but there must be guidelines for using conference calls, videoconferencing, e-mail and groupware to offset their limitations as communications tools, according to Jaclyn Kostner, an expert in effective communication in virtual workgroups.

Kostner's bestseller, *Virtual Leadership: Secrets from the Round Table for the Multi-Site Manager,* teaches modern business executives how to manage a global team, with some words of wisdom from none other than King Arthur himself. Kostner's consulting firm, Bridge the Distance International, based in Englewood, Colo., assists Fortune 500 companies in managing far-flung workgroups and telecommuters. Staff Writer Peter Fabris spoke with Kostner recently about how managers should lead virtual teams.

CIO: You've said isolation and lack of shared history are the enemies of managing remote work groups. Why are those factors so detrimental?

Kostner: Geography is a natural barrier to teamwork. We're used to being in groups in which people work in one location and can ask each other for support. When we're separated, we don't have the opportunity to meet each other

Reader ROI

MANY ORGANIZATIONS want to promote collaborative working environments to improve business processes, productivity and quality. Technologies such as audio- and videoconferencing, e-mail and groupware make collaboration possible even among workers dispersed across the globe. Virtual work teams and telecommuters pose thorny problems for managers. Readers will learn some effective strategies to manage virtual teams and how to apply technology judiciously to meet the challenge.

"The immediacy of talking back and forth, sharing ideas and supporting one another is what enhances our sense of team."

-Jaclyn Kostner

PHOTOS BY PATRICIA BARRY LEVY

for coffee or lunch, which can be very important ways to develop trust and rapport. We tend to underestimate the importance of time around the water cooler and the opportunity it lends to ask a colleague about a problem. When we're not face-to-face with our coworkers and we pick up the phone to seek that same kind of support, we often get voice mail, creating a whole different dynamic.

In addition, when we work in one location—whether it's developing products or delivering services—we can see the history we're creating and the successes everybody is achieving. The group that works virtually has fewer shared experiences.

Despite these difficulties, more and more organizations are forming virtual teams. How can managers get a handle on their new work force?

We ask clients "How often are you together as a team?" The norm is somewhere between six and 12 days a year. Because virtual teams are separated most of the time, when they do come together they must do a better job of creating interpersonal connections to develop a higher level of trust and rapport that will last while they are apart.

The worst mistake leaders make when they bring teams together is to have very long meetings that center only on the task. In their eagerness to get work done, they take very short breaks. They're so exhausted later, they don't do anything together in the evening. They tend to buzz in and out of town without taking a lot of time to socialize.

We suggest maximizing the amount of interactive time that occurs in those few days. Take half-hour breaks and a full hour for lunch, and bring food in so that it's easy to have time just to find out about each other. Talk about what you think about working in the company. Discuss where you want to be in five years, your hobbies, your interests.

Some managers might say, "Well, that all sounds fine, but we only get together every six to eight weeks, so we have to stick to a very businesslike meeting."

Almost every research study out there says that if your staff doesn't have trust and rapport, you'll be less successful. Managers who say they don't have the time to take a half-hour break or spend an hour for lunch without working on the task are very short-sighted. Ten years ago, most managers oversaw remote teams in a fairly direct way. They felt they had the right ideas and the solutions, and they would dictate their orders. Today we have people all over the globe in various market areas, so they can bring those perspectives to the group. Managers shouldn't bring everybody together and say, "I've got it all worked out. Here's our project plan. Do these things." If they do, people will go back to their remote locations and do whatever they were doing before. They're not going to leave feeling like they're part of the team.

Don't teleconferencing, groupware and e-mail help?

The immediacy of talking back and forth, sharing ideas and supporting one another is what enhances our sense of team. E-mail and voice mail are really poor media to do that. They just don't give us enough cues compared with face-to-face communication. You lose the voice inflection, you lose responses that indicate agreement and you lose an immediate response to a question. Videoconferencing, especially on the desktop, is an improvement. It's a lot better than

Getting to Know You

Jaclyn Kostner's tips for working better in the virtual workplace

Get acquainted with other team members.

MORE THAN 95 PERCENT of the communication a typical virtual team exchanges is one-way and filtered, through e-mail, for example. As a result, people who work virtually need to find out about each other as people and professionals and to interact as a team. When your team meets, dedicate no less than one-fourth of the day to getting acquainted or doing team-building activities. For example, have a pre-meeting breakfast. Take 30-minute breaks (not 15-minute ones). Each evening, go to dinner or a fun event together where all can talk. When meeting about the task, don't waste interactive meeting time covering anything that can be communicated via e-mail. Instead, use the time to discuss, problem solve and share.

Practice teleconferencing "netiquette."

WHEN YOUR TEAM IS APART, trust is broken when people communicate ineffectively through technology, such as when someone types in the background during a conference call, people at one site use the mute button to hide side talk or leaders routinely schedule meetings convenient to their own time zones, forcing team members at other sites to meet during their local lunch hour or after business hours. Netiquette establishes norms that enhance trust during electronic meetings.

Establish a communication plan.

NOTHING DESTROYS TRUST FASTER than leaving team members out of the loop on critical information about the team, the company or the result. Teams that work virtually need to set a regular communication pattern that is in sync with the pace and needs of their team. Your communication plan must be very clear about core team communication: who communicates what, by when and through which media.

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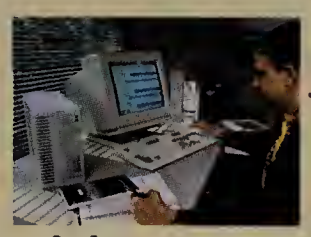

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just voice-to-voice in many situations, but it's still not as effective as face-to-face.

What are the pitfalls of virtual meetings?

Audio- and videoconference meetings tend not to be interactive. Teams that take an hour a week for an audio- or videoconference meeting need to use that time to share what's going on in remote locations. What problems are they having? What can they do to improve the sales we reached last week?

Some of the joint authoring types of software [such as Lotus Notes] improve on e-mail. When we write something in e-mail, it's almost as if it's carved in stone, like a decision has already been made. And people get very irate if they haven't been part of the decision or if their views haven't been heard. Joint authoring software enables us to have more of a sense of us creating things together because it's more collaborative.

What can IS managers, particularly those who oversee virtual software development teams, do to encourage collaboration?

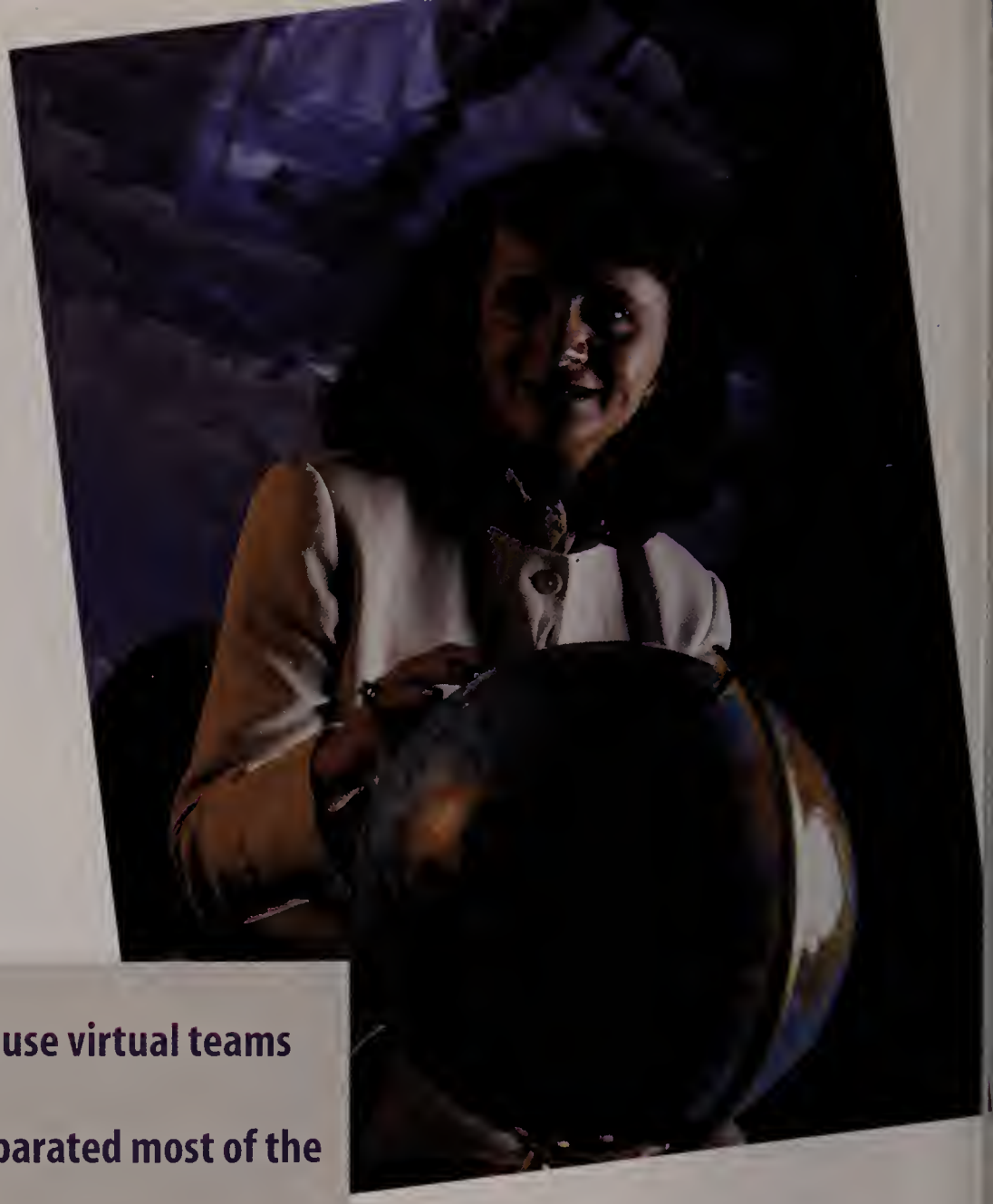
A software team that is developing in remote locations usually divides the project into fairly discrete components. The experience the team creates is site-bound, and it becomes important for leaders to be creative and disciplined about amplifying the team's experience. For example, when they meet, they should try to do things that are fun, too, to begin to create a shared history. They also need a forum in which to share problems and emphasize successes such as finishing a piece on deadline.

Managers will also need to get very specific in defining roles and responsibilities. If the teams meet regularly, even on audio- or videoconferencing, they can assess how they are progressing regularly.

The most important thing is that everybody sees very clearly how their pieces relate to a more global picture. People will tend to see things based on their own site and their own segment and lose the big picture.

You're skeptical about the benefits of telecommuting.

I haven't found any research that supports telecommuting as a means of improving productivity. Managers are more comfortable managing people who are on site. Coaching, catching people doing things right and giving immediate feedback are all easier to do in person.



"Because virtual teams are separated most of the time, when they do come together they must do a better job of creating interpersonal connections."

Is there anything a manager can do to make it work?

For starters, select the right number of days (usually one to three per week) for individuals to telework. Full-time telecommuting from home is isolating, even when people request it. Also, create a clear, written contract that outlines performance expectations. Discuss what work is to be done, how work will be evaluated, how often the manager and teleworker will meet to review performance. More frequent evaluation in the beginning is worth the time you invest.

Also, set a clear communication plan that keeps all telecommuters in touch and set clear guidelines so that telecommuters can be reached in real time during the business day. One of the greatest trust-breakers is when a boss reaches a teleworker's voice mail when a live answer is expected. If you launch telework effectively, it's possible that many of your teleworkers will work harder and longer than they ever did in the traditional office. CIO

Staff Writer Peter Fabris can be reached at pfabris@cio.com.

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Emerging Technology

THE STATE OF THE ART, NEW PRODUCTS AND STAYING AHEAD OF THE CURVE

Edited by Elaine Cummings

Server Software Suites

BackOffice provides new glue for the enterprise

BY RICK COOK

AFTER A LONG GESTATION PERIOD, BackOffice, Microsoft Corp.'s server suite, has emerged as a glue for holding together applications and jobs all over the enterprise. Currently, it's more Elmer's than Super Glue, but an increasing number of enterprises are using it nonetheless.

For IS management, BackOffice provides a standardized, integrated suite of servers with standardized APIs (application program interfaces) that can be used by applications anywhere in the enterprise. "BackOffice becomes the common platform from which to launch enterprise-style applications based around a PC network," says Rob Enderle, senior industry analyst for market researcher Giga Information Group, headquartered in Cambridge, Mass. "It doesn't quite have the scalability for the really big stuff, but for everything short of that, it is the preferred platform."

BackOffice is aimed directly at one of the most bedeviling problems in enterprisewide computing: trying to use and apply information across the heterogeneous systems of most enterprises. Software is different, operating systems are different, hardware is different and applications are likely to be very different indeed. What's more, in a typical company, any of those pieces can change at any time. That's seldom a big problem, but it is a constant, harassing and never-ending one—something more akin, perhaps, to being nibbled to death by ducks than being torn asunder by wild horses. But as many weary managers will tell you, nibbled to death by ducks gets you just as dead.

The integration of the BackOffice products isn't finished yet, but it is complete enough to make information exchange on a given platform relatively easy and on a high enough level to simplify life for programmers enormously. Says Enderle: "In many cases, you've got drag-and-drop capability with the ability to create relatively complex applications. Where you once might have developed an application from scratch, you can now develop from components, which cuts back on testing as well."

The ease of development comes in two forms. First, BackOffice provides a bit of stability for application developers. Once the application contacts one of the BackOffice servers, it can be reached by almost anything else that can reach BackOffice.

That is somewhat different from interchange standards such as OLE (Object Linking and Embedding, or Active-X as it is sometimes known) or Corba (Common Object Request Broker Architecture), which let applications share objects. OLE and Corba define interfaces, but they don't define the services behind them. With BackOffice, programmers know what services are available to use the objects and data when they are shared, which saves detail work for programmers and major

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architectural decisions for management.

Another aid to development is that the servers in BackOffice are integrated. Although they are separate products, Microsoft has made sure they can exchange information among themselves. That concept is not particularly new: BackOffice bundles a number of mostly pre-existing Microsoft servers, and versions of the BackOffice suite have been available for at least two years. But in the last two years, BackOffice has gone from being merely a good idea to being an implemented one.

Further speeding application development is the fact that all the products making up BackOffice (see box, Page 104) conform to Microsoft's OLE standard for data and code sharing. "BackOffice saves us time and effort because a lot of the integration has already been done by Microsoft," says Lyle Anderson, CIO of New York-based HarperCollins Publishers Inc. "We can leverage the OLE model across the components and infrastructure. It gives a consistent environment in which our developers can work."

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BackOffice is best at building data marts, according to Eric Brown, a senior analyst at Forrester Research Inc. in Cambridge, Mass. Brown defines data marts as "small, typically read-only databases that have the information a knowledge worker needs to make decisions." Unlike data warehouses, which contain all the corporate data, data marts extract the information needed by a department or other group and store it on a local server.

BackOffice and its components, notably SQL Server, shine in that kind of situation. The common APIs of the BackOffice products let them exchange data with each other, and the database capabilities of components such as SQL Server and SNA Server let them extract and process information from the larger databases. At the same time, the degree of integration with Windows desktops and applications such as Microsoft Excel spreadsheets makes it easy to present the information to users.

"If I were to try to answer a question by going at the entire corporate database, it might be difficult to navigate," Brown says. "But if I have a snapshot of the data that's meaningful to me, I can extract the data I need."

Earlier versions of BackOffice had a lot of rough edges—the suites always had at least some data interchange capabilities, but those capabilities were much more limited. And some of the pieces,

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such as Microsoft Exchange and the Internet server, simply weren't there. "You kind of had to go around your elbow to get to your thumb," recalls Richard Warren, vice president for information services at Washington-based Judd's Inc., one of the biggest magazine printers in the United States.

Now, says Warren, "it's hard to think of any service in which you can't invoke some sort of wizard to make the jump for you. They've lowered the bar significantly on the kind of knowledge it takes to knit things together."

In addition, Microsoft itself has decided that BackOffice is important and has thrown its marketing muscle behind the suite. The company is promoting third-party development of BackOffice-compatible products in a wide variety of industries, has established a Solution Provider program to help companies develop applications based on BackOffice and features technical support for software developers working with BackOffice.

But Microsoft being Microsoft, there's nothing charitable about the proposition. BackOffice is not only made up of Microsoft products, but it also runs on Microsoft's Windows NT operating system. As far as operating systems or servers go, "best of breed" stops at Microsoft's front door. BackOffice is also carefully crafted to meet Microsoft's definition of "open," which is to say it is designed to let outside software developers write to it. As it turns out, that's open enough to make the product useful, especially for companies using NT for a significant portion of corporate IS.

Of course, BackOffice has limits; most revolve around scalability and the strength and integration of the various components. Microsoft is working to improve those areas, but Brown and Enderle both say it will be 1998 or so before the scalability problems, at least, can be fixed.

As it stands now, BackOffice is best suited for single-server solutions—data mart rather than data warehouse applications—with up to a few thousand users in a single NT domain. That is partially because of the complexities of managing NT across domain boundaries and partially because of the lack of enterprise-quality system management tools in BackOffice.

"Managers who are used to managing desktops and who are moving into the server environment are more comfortable working with NT and BackOffice," says Chris Le Tocq, director of software research at Dataquest in San Jose, Calif. "Those who have experience with enterprise-quality system management tools will probably plan to use tools such as Computer Associates International's Unicenter."

Enderle generally agrees. "BackOffice products play best when connected to Windows desktop clients and for a company that predominately has Windows on the desktop," he says. "Enterprises with a huge mix [of hardware and soft-

Can We Talk?

SPEECH-TO-TEXT

COMPUTER USERS FRUSTRATED by clunky keyboard, trackball and mouse interfaces may wish sometimes that they could just tell that darn PC what to do. That wish may soon be fulfilled for many. Speech-to-text technology is moving from niche markets like medicine and law (doctors and lawyers use it to record dictation) to the mainstream. IBM's next version of OS/2 Warp, code-named Merlin, will have voice recognition with a 10,000-word vocabulary embedded in it at no extra cost. Prices have fallen steadily in recent years for speech-to-text products—comparable with Merlin's speech recognition feature—by Dragon Systems Inc. in Newton, Mass., and Kurzweil Applied Intelligence Inc. in Waltham, Mass. "Not long ago, the software was priced at several thousand dollars for general purpose dictation," says Bill Meisel, an independent industry consultant based in Encino, Calif. "Now it's free with Merlin." Higher-end systems that recognize 60,000 words can be purchased for less than $400.

As prices fall, more companies and individuals are adopting the technology. The market for speech recognition software is expected to increase from $6.78 billion in 1995 to $10.3 billion by the end of 1996, according to Meisel's estimates. Those figures include both voice control software and the more sophisticated speech-to-text products, such as those from Dragon, Kurzweil and IBM. Voice control systems by vendors such as AT&T, Microsoft Corp. and developers of speech technology like the Belgian company Lernout & Hauspie allow users to give computer commands by voice but recognize fewer words and are unsuitable for dictation.

Still, these products are well suited to simple tasks such as automated customer-service telephone lines.

Although speech dictation products can liberate users from the keyboard, that's not necessarily their main value to businesses. "The misconception is that [speech recognition technology] is an alternative to the keyboard," Meisel says, "but that's not where the payoff is. Telling the computer to 'send this report by fax to Joe Jones,'" for example, is easier and takes less time than performing the same steps manually."

In addition, speech recognition can help a user search for files or other information. Asking the computer to locate the report you wrote for the last trade show is easier than searching for an obscure file lurking somewhere on your hard drive. While both methods may work, "speech is simply more elegant," Meisel says. *–Peter Fabris*

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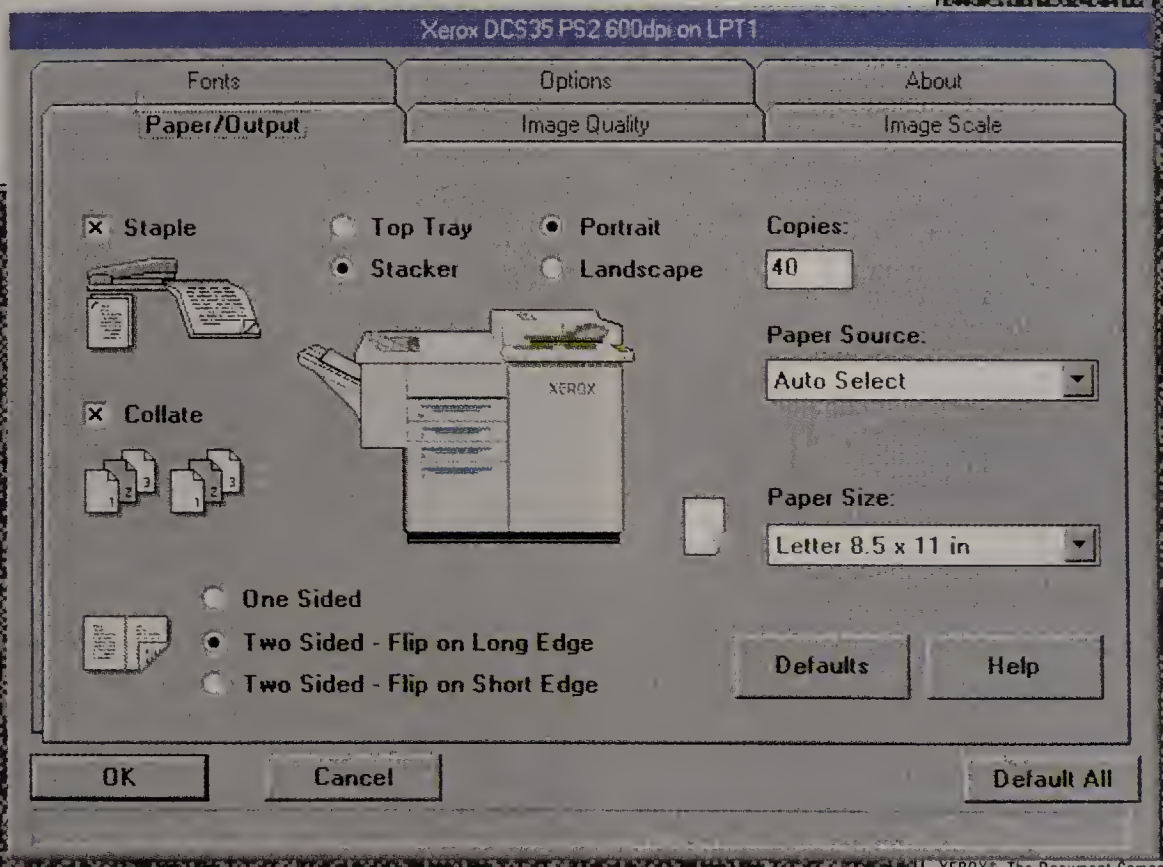

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ware] tend to have it sitting under Unicenter or Hewlett-Packard's Openview."

Forrester's Brown also points to BackOffice's lack of directory services for distributed management. "So much of distributed management strategy in the industry in general is dependent on creating a corporate directory that rationalizes corporate access," he says. "NT's weakest link now is probably a scalable solution. It's possible now, but it won't be great until the 1998 version of NT."

According to International Data Corp. (IDC), a Framingham, Mass., market research company, NT sold half as many copies as Unix in 1995. Dataquest predicts that NT will outsell Unix by 1998.

IDC also found that workstations running NT accounted for 22 percent of the workstation market in 1994. That was 5.5 times sales in 1993. Other analysts predicted a 30 percent growth in 1995 in the NT workstation market and even more growth this year.

For large enterprises using Exchange Server in BackOffice, domain management becomes a problem. "People scaling up Exchange spend a significant amount of time scaling the NT domains," says Brown. "To scale up Exchange, you need to scale up the number of users NT can support. You need multiple domains and end up managing trust relationships between domains. That's a serious challenge."

Microsoft Exchange Server can handle only a few thousand users per domain. To add more users or subdivide the enterprise into domains, you have to manage inter-domain communication—a limitation supporters of competing products, notably Novell Netware and IBM/Lotus Notes, like to play up.

Judd's Warren says domains are a consideration in using BackOffice. "In a larger enterprise model, the trust relationship within the server domains becomes a significant design issue," he says. "And frankly the permission levels within the domains are so granular it is possible to make mistakes."

Enderle, however, is less concerned about multiple domains. "They do create a certain amount of complexity, but the number of domains is still small," he says. "The biggest I have seen is five domains on one campus."

Because BackOffice runs on Windows NT Server it is, in a limited sense, platform independent. That is, it works on machines based on Intel Corp. processors, Digital Equipment Corp.'s Alpha processor and some of the MIPS RISC chips. That gives a fair degree of scalability, especially now that computer makers are releasing symmetrical multiprocessing machines that use four or more processors under NT.

Within the limits of the processing power they support, NT and BackOffice offer some platform independence and scalability, according to users. "I

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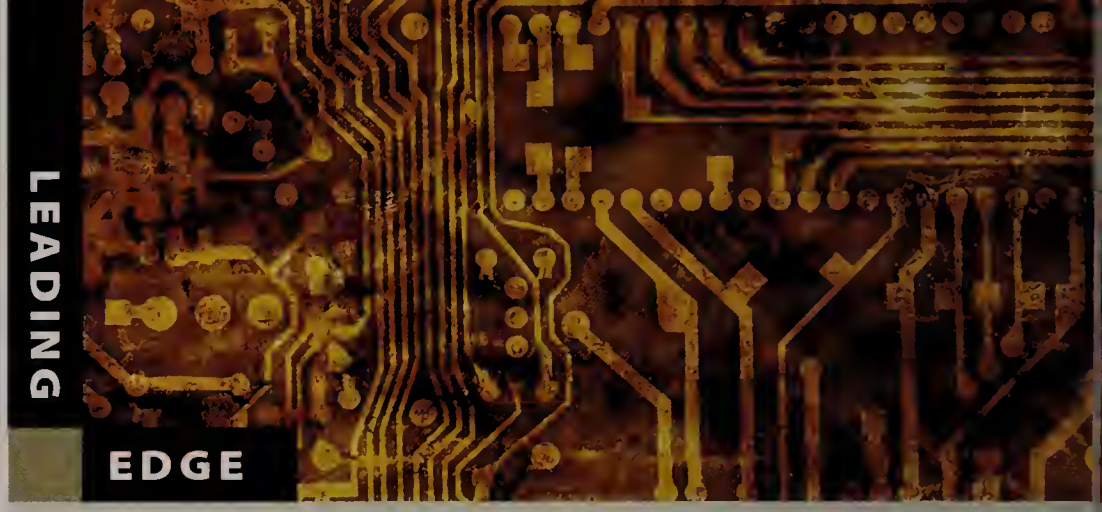

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can have my application developers plugging along on high-end Intel machines, and when the time comes to ramp up for production, I can plug into DEC Alpha," says Warren. "Because they're using the same API, I don't care about the architectural differences. At my level of applications, I can easily scale from the development environment to the production environment and even extend it if the application takes off widely just by changing the kind of server I host the process on."

Of course, it is also possible to make too much of BackOffice integration. The products in BackOffice are available separately. Enterprises can pick and choose among them, and many do. "The savvy IS manager is going to look at BackOffice in much the same way as other bundling arrangements," says Dataquest's Le Tocq. "In other words, what are the important things to me, and what don't I care about?"

BackOffice suites can communicate with each other, but they are not tightly integrated. In fact, the integration is so loose that many people don't even consider BackOffice a suite. Le Tocq calls the integration "more perceived than actual," while Giga's Enderle says BackOffice is "still a set of separate tools that are often implemented separately."

Brown praises the SQL Server component of BackOffice but feels some of the other components, notably Exchange and SMS, are not as strong. And Warren points out that the simplicity of information exchange under BackOffice can be a two-edged sword. "It raises an interesting issue about the other half of the 'empowerment' curve—the 'responsibility' curve," he says. "It demands a different degree of responsibility on the part of the end user. The more you let the end user do, the more you have to rely on the end user to do the right thing."

One solution is to use the data mart concept and supply most users with tools that are less sophisticated but easier to use. "In broad terms, the idea of raising the corporate IQ is to take the information the company knows and deliver it to as many people as possible," Brown says. "To do that, I need two things: a way to get information delivered to servers and a way to enable people with easy-to-use client software." Traditionally, that has meant taking a large database, rolling it up into a corporate warehouse and giving selected workers sophisticated modeling tools. "To expand that picture, you have to push the data out in a more digestible way and create client software as accessible as an office suite or a Web browser," says Brown.

BackOffice 2.0 includes:

Windows NT Server 3.51, the underlying operating system

Microsoft SQL Server 6.5 (upgraded from 6.0), which provides DBMS services, including SQL

Microsoft SNA Server 2.11 to connect to IBM mainframes and AS400s via SNA protocol. Microsoft Exchange Server 4.0, which replaces Microsoft Mail Server used in earlier versions

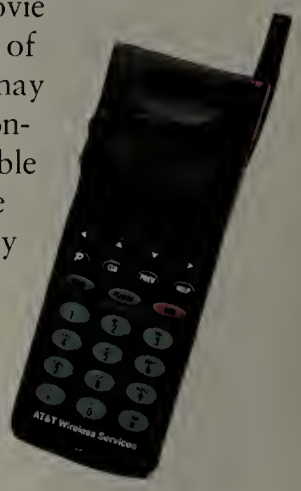
Microsoft Internet Information Exchange Server 2.0—Microsoft's new Web server and Web publishing software

Microsoft Systems Management Server 1.1 for managing networked PCs

WIT and Wisdom

THE YANKEE GROUP HAS DUBBED them "Wireless Intelligent Terminals." *Business Week* prefers the term "Information Appliances." No matter what they're called, wireless network machines are already jockeying for position in the marketplace. One device, **AT&T Wireless Services' PocketNet Phone**, an integrated cellular phone and wireless Internet appliance, provides people on the go with fast and convenient access to Internet information and two-way messaging services.

Business services, such as airline flight information and stock quotes, will be offered, as will personal services like sports scores, local movie listings and lottery results. The range of potential information services soon may equal the variety and depth of Web content, says AT&T. Users also will be able to employ the phone to communicate by e-mail—scanning their messages by title and responding to the urgent ones—as easily as they would talk on a cell phone.



The Internet phone can extract small amounts of precise information from the wealth of the Internet's content. The phone's specialized browser extracts only text-based information; it ignores burdensome multimedia and graphics. With this approach, the browser optimizes the cellular phone's compact display size, memory footprint and wireless connectivity for information services.

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In information technology, opportunities emerge as often from new, easier ways of doing things as they do from completely novel inventions. What is emerging with BackOffice is a standard for simple, widely used applications that extend or share data across the entire enterprise. That benefits not only independent software vendors that now have a logical starting and stopping place for NT applications, but in-house software developers as well. The improvements may not always be radical, but they are very real. CIO

Rick Cook is a freelance writer based in Phoenix. He can be reached at rcook@bix.com.

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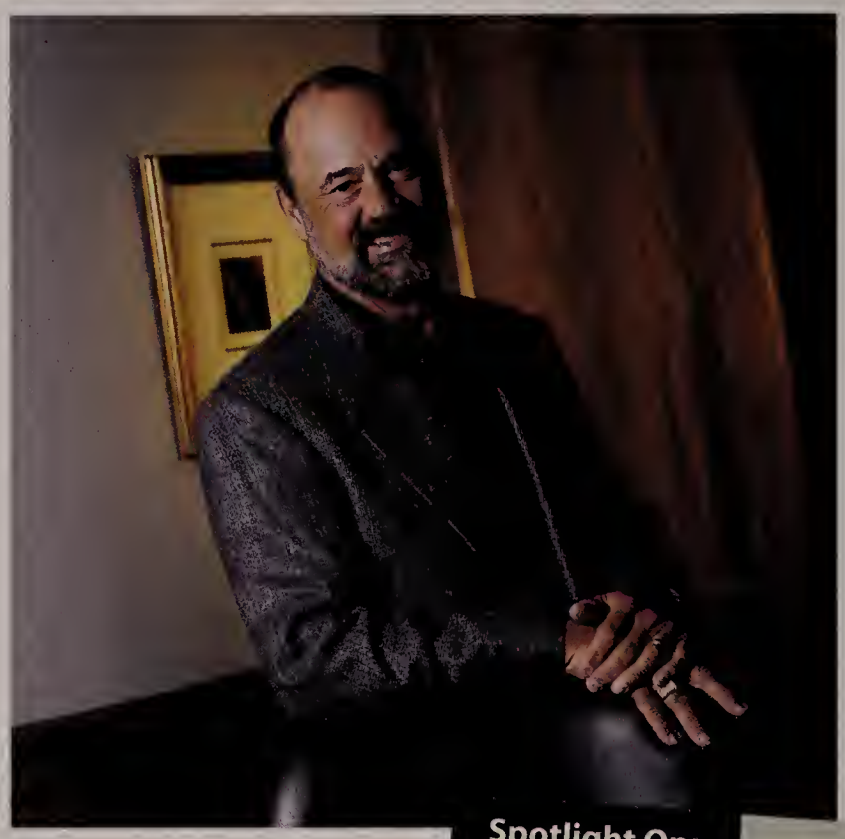
ShopTalk

Acxiom's Alex Dietz on Slashing Processing Costs



Spotlight On:

Alex Dietz, *Senior vice president and CIO, Acxiom Corp., Conway, Ark.*

- **Line of Business** Database Marketing
- **Bio** Named CIO in 1991.
- **Day to Day** Responsible for data warehouse development tools, decision support application tools, list processing tools and data delivery tools. Manages Acxiom's R&D, directs 600-person IS staff, administers $51 million IS budget.
- **Challenges** Overseeing data warehouses; aggressively reengineering all legacy systems to run in a client/server environment on the SMP platform.

CIO: Why does Acxiom buy only used mainframes?
We reduce our data processing costs significantly by self-maintaining. We hire our own customer engineers and maintain our own equipment, even our non-IBM stuff. Our self-maintenance strategy costs one-third of what we might pay for hardware maintenance from IBM.

What are the operational advantages to doing that?
We run a 24-7, on-demand computing environment, so overall responsiveness and flexibility are important. We can reconfigure a data center in a matter of days. It's impossible to put a dollar figure on that capability, but it is worth a lot to Acxiom.

How do you use your mainframe?
We use a LAN of mainframes to do large-scale list, data and analysis processing of marketing databases for our customers. Our network resembles a client/server environment. We have an [IBM] ES9000, which is both our network machine and a control file server. To the hub we attach mainframes configured to do a handful of specialized jobs. When we need extra capacity, we simply plug another CPU into the architecture through a channel connection.

Because our attached mainframes run a limited set of applications, we can use older hardware running a non-MVS operating system. The result is we can add MIPS in less time and at a fraction of the cost of constantly upgrading to the latest IBM box.

What has this strategy done for your IT costs?
We have consistently pushed our data processing costs down as a percentage of revenues. In 1994, our DP costs were about 19 percent of our list processing revenues; in 1995 and 1996, that figure is closer to 15 percent.

Sounds like you'll never be totally out of the mainframe business.
Mainframes do a good job of handling large aggregations of I/O. And we can still take advantage of new hardware and software technology.

What technologies are you considering?
We have done a lot of work with a tape technology called DLT [digital linear tape]. A DLT cartridge about the size of a 3480 cartridge can hold 20, 40 or 70GB of data. Some files that require 200 3480 cartridges now fit on just three DLT cartridges.

We also like SMP [symmetrical multiprocessing]. I think clustered SMP might deliver scalability in the parallel processing environment.

Will you build or buy most of this technology?
I buy more than I have in the past just because I can't build it all anymore. Acxiom is growing by 35 percent per year, so I have to change my strategies every year.

How will your IT strategy for the next two years support Acxiom's growth rate?
We're reengineering our legacy systems to run in a client/server environment and to replace our attached servers with Unix- and Windows NT-based SMP platforms.

We want the interoperability and cross-platform capabilities of an open environment, but the primary goal is to take advantage of parallel processing platforms. Our initial efforts have yielded typical cycle time reduction of three to five times the mainframe baseline using four-processor SMP platforms.

You really like to push the envelope.
We do things that would be inherently risky for mainstream companies because it gives us a competitive advantage in time to market.

–John Whitmarsh

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